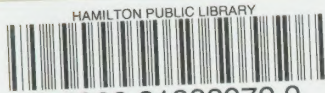


CABON/HWQ60

8/14/16



3 2022 21292972 9

MUNICIPAL

HAMILTON PUBLIC LIBRARY
OCT 09 1981
GOVERNMENT DOCUMENTS

HAMILTON-WENTWORTH POPULATION PROJECTIONS 1981 REVIEW

PLANNING AND DEVELOPMENT DEPARTMENT
THE REGIONAL MUNICIPALITY OF
HAMILTON-WENTWORTH

SEPTEMBER, 1981



Digitized by the Internet Archive
in 2023 with funding from
Hamilton Public Library

HAMILTON—WENTWORTH
POPULATION PROJECTIONS
1981 REVIEW

PLANNING AND DEVELOPMENT DEPARTMENT
THE REGIONAL MUNICIPALITY OF
HAMILTON—WENTWORTH

SEPTEMBER, 1981

HAMILTON-WENTWORTH REGION
POPULATION PROJECTIONS - 1981 REVIEW
TABLE OF CONTENTS

	PAGE
SUMMARY	
INTRODUCTION	3
<u>PART ONE: STUDY FINDINGS</u>	
1.0 Population Growth Trends	5
1.1 Population Growth Indicators	7
1.2 Conclusion	9
2.0 Revised Population Projections, 1981	10
2.1 General Methodology	10
2.1 The Projection Process	11
2.3 Findings	11
2.3.1 Regional Population Projections	11
2.3.2 Area Municipal Projections	15
2.4 Conclusion	17
<u>PART TWO: BASIS OF POPULATION PROJECTION - 1981 REVIEW</u>	
3.0 Introduction	19
3.1 The Projection Model	20
3.2 Projection Variables	21
3.2.1 Base Populations	21
3.2.2 Fertility Rates	24
3.2.3 Proportion of Male Births	31
3.2.4 Death Rates	32
3.2.5 Migration	37
3.2.5.1 Total Net Migration	37
3.2.5.2 Profile of Age and Sex of Migrants	57
APPENDIX	
Intra-Regional Migration (Map A-1)	A-1
Net Migration, 1971 - 1980	
Ancaster	A-2
Dundas	A-3
Flamborough	A-4
Glanbrook	A-5
Hamilton	A-6
Stoney Creek	A-7

SUMMARY

A technical review of future population has revealed that:

- The year 2001 population forecast of 550,000 adopted by Regional Council in February, 1976 now appears to be unrealistic.
- Existing forecasts based on trends now indicate a Regional population in the range of 423,000 to 479,000 but with a 'most-likely' value of 445,000 by the year 2001.
- Population growth in the Region has not kept up with 1976 predictions, falling behind nearly 23,000 from 1975 to 1980.
- Substantial declines in the number of births and a net outflow of persons from the Region are responsible for the lower forecast.
- The municipalities of Stoney Creek and Ancaster are assessed as being in a position to attract a major share of the population growth in the future.
- Although the projected allocation of population shows little or no increase in some urban areas of the Region, recent trends in decreasing household size show that a significant amount of new residential development will still be necessary.
- A continuation of the trends of decreasing birth and death rates will result in an increasing proportion of the population being in the older age categories in the future.

INTRODUCTION

During the latter part of 1975, Planning staff prepared a demographic forecast indicating a Regional population of 550,000 as 'Most-Likely' to the year 2001. This forecast was subsequently adopted by Regional Council in February, 1976 and used in the development of the Regional Official Plan. The assumptions and methodology used to develop the forecasts are outlined in the background report Population Future Growth - Regional Official Plan Study. (This forecast is referred to as the '1976 Projection' in this report.)

Since 1976, staff has kept Council informed, on an annual basis, of the progress of population growth through the report Housing and Population Monitoring. It has become clear that current population growth trends are not in accordance with the 1976 Projection and that a forecast revision is warranted.

This technical report presents an updated population projection taking into account current demographic and social trends. Included are projections to the year 2001 for the Region and each component area municipality.

The report contains two parts. Part One reviews, in summary form, recent trends and presents new population forecasts for the Region and area municipalities. Part Two presents, in detail, the basis for the population projections presented in Part One.

PART ONE

STUDY FINDINGS

PART ONE: STUDY FINDINGS

1.0 POPULATION GROWTH TRENDS

Figure 1. charts the Region's population growth from 1970 to 1980. Also shown is the 1976 Projection trend line which reaches 550,000 people in the 2001. The graph shows the population line breaking away from the trend line in 1975 and maintaining a constant position to 1980. The population was 410,145 in 1975 and 410,648 in 1980. The shortfall in 1980 from the trend line was just over 23,000 people.

FIG.1

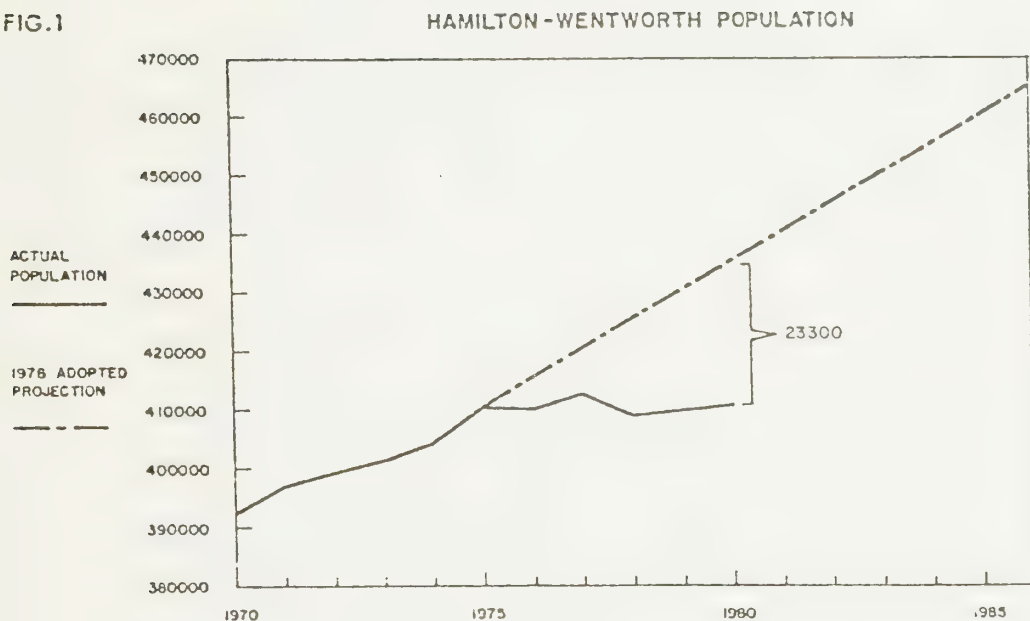
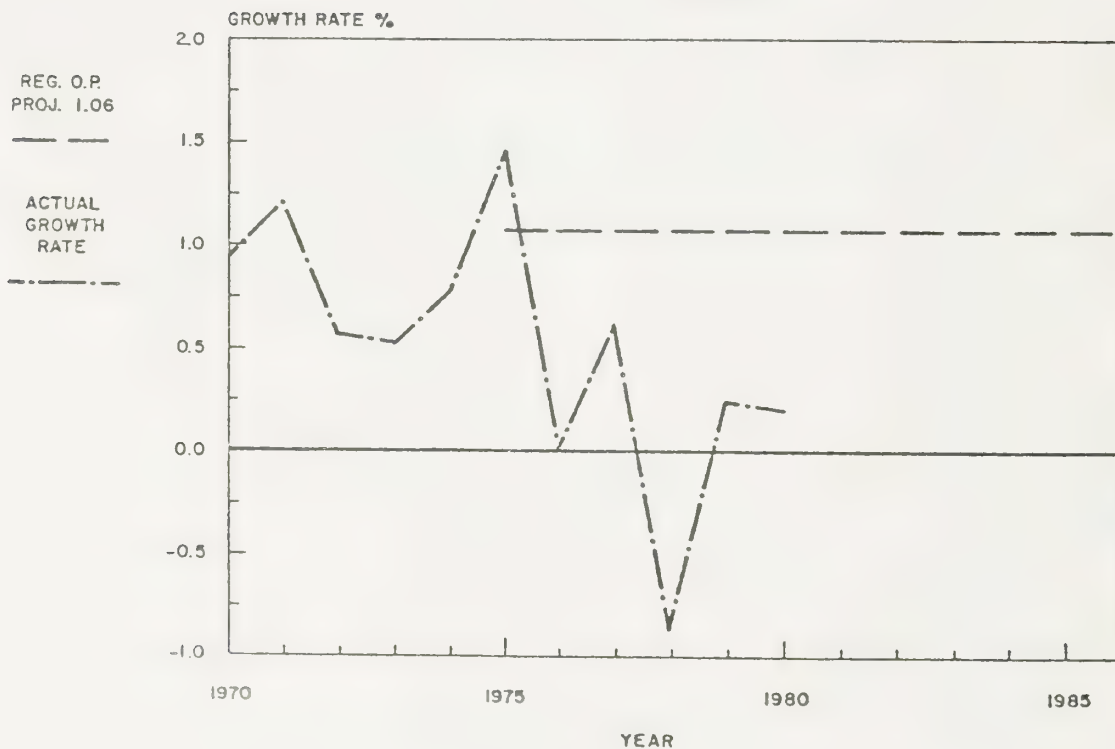


Figure 2 shows the percentage population growth rate achieved by the Region since 1970. The 5 years following 1975 show values considerably lower than the annual rate forecast in the Regional Official Plan of 1.06% compounded annually. From 1975 to 1980, the growth rate has averaged 0.03% - virtually no population growth.

FIG. 2

REGIONAL POPULATION GROWTH RATE

SOURCE: ASSESSMENT



1.1 Population Growth Indicators

An in-depth look at the 1976 Projection shows the difference between assumed and actual growth indicators over the last 6 years. The key variables used to project population and the assumed values for each of the variables* were as follows:

Annual Birth Rate: 17.3 per thousand population
Annual Death Rate: 7.8 per thousand population to 1986
8.0 per thousand after 1986 to 2001
Annual Net Migration: + 1,037

Table 1, on the following page, illustrates the actual values achieved for each of the three key projection variables.

The 1976 Projection predicted that the long continuous decline in the birth rate (then at 14.9 births per thousand population) would eventually reverse directions and average 17.3 per thousand for the period to the year 2001. Instead, the rate has continued to decline, reaching 13.3 births per thousand in 1979.

Death rates have averaged 7.9 deaths per thousand population from 1975 to 1979. This trend was predicted accurately.

Migration** activity has differed significantly from that predicated in the 1976 Projection. Over the past 6 years, 7,728 more migrants left the Region than came into it. An average annual loss of 1,288 persons per year has been experienced. Since an average annual inflow of 1,037 had been predicted, the difference between predicted and actual amounts to 2,325 persons per year.

* The variables, birth and death rates, are expressed in values per thousand assessed population for the year in question.

The variable, net migration, is the difference between immigrants minus emigrants and is derived from assessment population by deleting natural increase (births minus deaths).

** (This report is concerned only with population changes affecting the Region, therefore, the origins and destinations of migrants have not been studied specifically. However, it is known from Provincial studies that an increasing number of Ontario residents are relocating in Western Canada. Hamilton-Wentworth can be assumed to be contributing its share.)

TABLE 1.

COMPONENTS OF POPULATION GROWTH

<u>YEAR</u>	<u>BIRTH RATE BIRTHS/1,000 POP.</u>	<u>DEATH RATE DEATHS/1,000 POP.</u>	<u>NET MIGRATION</u>
1975	14.2	7.8	3,056
1976	13.9	7.7	- 2,527
1977	13.5	7.8	+ 145
1978	13.6	8.1	- 5,934
1979	13.3	7.8	- 1,305
1980	N/A	N/A	- 1,200 (estimated & rounded)

N/A: Information not available

Source: Vital Statistics, Ontario Registrar General;
Assessment Population

The relative difference in terms of population between the current and predicted positions of each growth indicator between 1975 to 1980 are shown below.

Birth Rate:	- 9,100 persons	(39%)
Death Rate:	- 250 persons	(1%)
<u>Net Migration:</u>	<u>- 13,950 persons</u>	<u>(60%)</u>
Total Difference:	- 23,300 persons	(100%)

The net migration component of population growth is the main cause for the shortfall from the 1976 Projection trend contributing 60% of the total deviation.

1.2 Conclusion

It is clear from the preceding information that population growth trends have not followed the patterns predicted in 1976. A recovery in growth that would meet the established Regional forecast of 550,000 persons by the year 2001 is considered to be unlikely, given current circumstances. Adjustments to the Regional Projection are recommended to more accurately reflect current conditions.

2.0 REVISED POPULATION PROJECTIONS, 1981

2.1 General Methodology

The population projections of this study were derived using an Age-Cohort Survival Model. This method was chosen to maximize the reliability of results. Five other methods were considered including: the Extrapolation Method, the Ratio Method, the Employment Method, the Migration and Natural Increase Method, and the Migration Estimates Method.

The Migration and Natural Increase method was used for the 1976 Projection. This method has been rejected because it is not as reliable as the Cohort method. It applies average growth rates to the population as a whole rather than to a particular age groups within the population. This method cannot account for changing birthrates (as the daughters of the babyboom pass through childbearing years), nor can it account for an increasing deathrate (as a greater proportion of the population enters the older age categories).

The Cohort method is designed to operate with specific age and sex information and produce results year by year in the same detail to the end of the projection period. A given 'base' year population is put into the model in single years of age and sex and processed through time by applying assumed age and sex specific information on fertility rates* death rates, net migration and by male birth ratios**.

Population forecasts giving age and sex breakdowns are considerably more useful to planners with interests in housing, education, recreation, health and other social welfare services.

The Cohort method requires a great deal of information to operate, but it is computer driven and can be manipulated to test a number of variable conditions.

* Fertility rate is the number of births per thousand women in the reproductive age group 15 to 49 years of age.

** Male birth ratio is the proportion of males to females born.

2.2 The Projection Process

The objective of the study was to determine a 'Most Likely' population projection for the Region and its 6 component municipalities to the year 2001.

In the process, a number of alternatives were considered for each of the growth characteristics used to produce projections. These characteristics are birth rates, death rates and net migration. Each was considered on the basis of past performance and its possible future extension for the area under study. A confidence range was established for each area described by 'High' and 'Low' values. As a final step, a decision was made using growth characteristics from within the confidence range to produce a 'Most Likely' population projection.

Details of specific assumptions considered for each of the growth characteristics are presented in Part Two of this report.

2.3 Findings

The results of the population projection process are summarized in Sections 2.3.1 for the Region, and 2.3.2 for area municipalities. This information was extracted from large volumes of computer produced results. More detailed information is available for age and sex of the population, by single years of age, year by year, to the year 2001.

2.3.1 Regional Population Projections

Table 2. on the next page shows 5-year incremental values of the population projections for the Region for the 'High', the 'Low' and the 'Most-Likely' alternatives. Figure 3. illustrates the relative positions and progression of projections over time compared to recent growth trends.

TABLE 2.

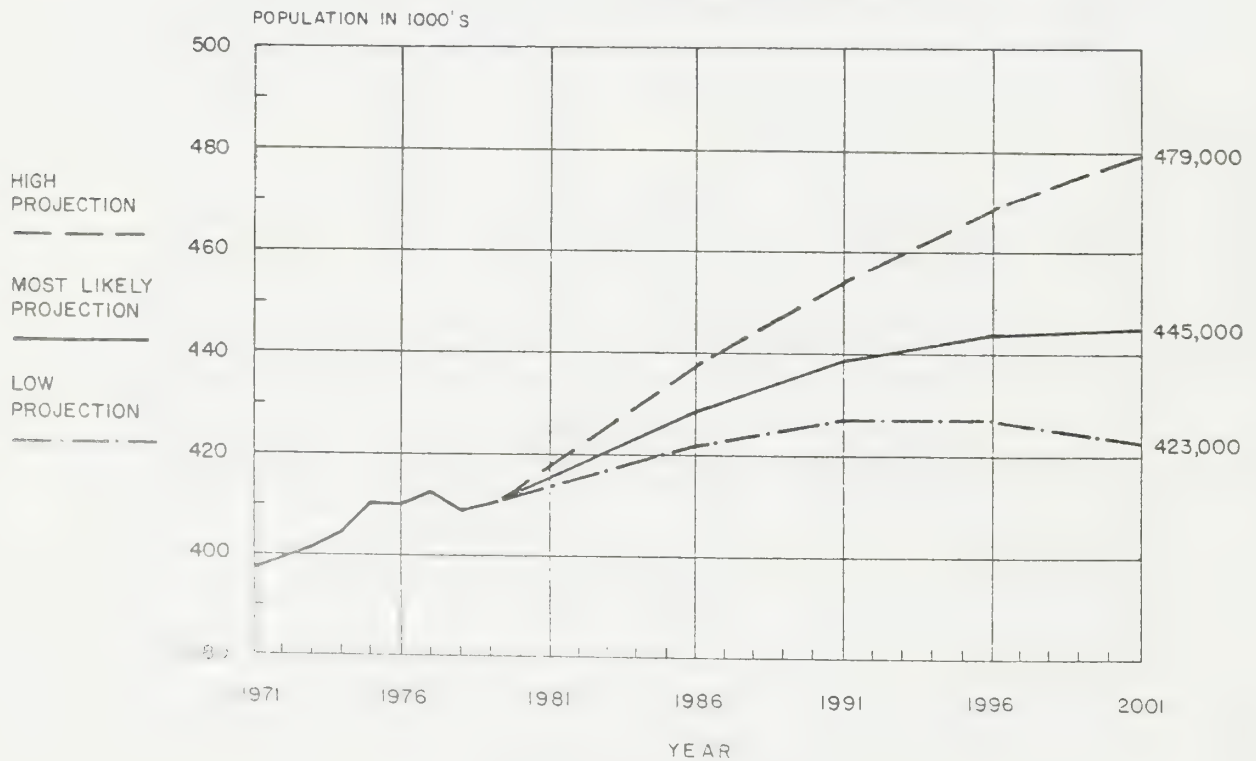
REGION POPULATION PROJECTIONS
(Rounded to the Nearest 500)

<u>PROJECTION NAME</u>	<u>1986</u>	<u>1991</u>	<u>1996</u>	<u>2001</u>
High	436,500	453,500	467,500	479,000
Low	422,000	427,000	427,000	423,000
'Most Likely'	428,500	438,500	444,000	445,000

FIG. 3

HAMILTON-WENTWORTH POPULATION PROJECTIONS TO 2001

1971-1979 ACTUAL - MODIFIED ASSESSMENT



Under the 'Most-Likely' projection, the Region's population is forecast to increase by 34,350 to 445,000 by the year 2001 from its 1980 value of 410,650. This represents a positive increase of 0.38% compounded annually over the period, but is significantly lower than the 1.06% compounded annual growth rate forecast in the Regional Official Plan projection.

Figure 4. on the following page shows actual 1980 and 2001 'Most-Likely' population for the Region, distributed by 5-year age groups. The upper part of the chart shows that the present distribution is characterised by two distinctive features:

- i) a declining number of children;
- ii) a bulge in the 15-29 year age categories known as the "post war baby boom" group.

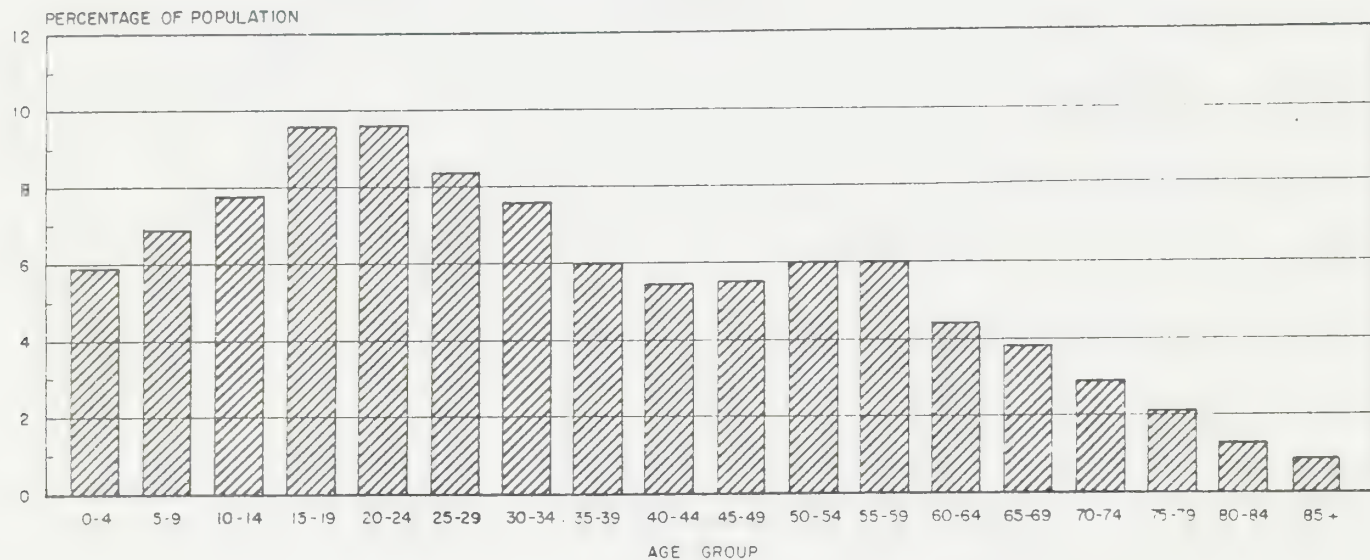
The lower part of the chart shows how the age distribution of the Region's population is expected to look by the year 2001. It is expected that:

- the "baby boom" bulge will have advanced to the 35-49 year age categories. New births from this group of the population, having passed the most fertile periods in the age cycle, are anticipated to be negligible.
- a secondary bulge is projected to occur as a result of the offspring of the "baby boom" group but it will not produce as many children as was generated by the parent group because of lower fertility rates.
- there will be a greater proportion of older people living in the Region as a result of lower fertility and death rates.
- the lower proportion of the youth group will result in 9,300 fewer school-aged children between the ages of 5 and 19 years than in 1980 when there were 96,626 in this group. This represents nearly a 10% decline.
- the number of people over the age of 65 is expected to increase by 18,200 or 41.5% of the 1980 population of 43,877.

FIG. 4

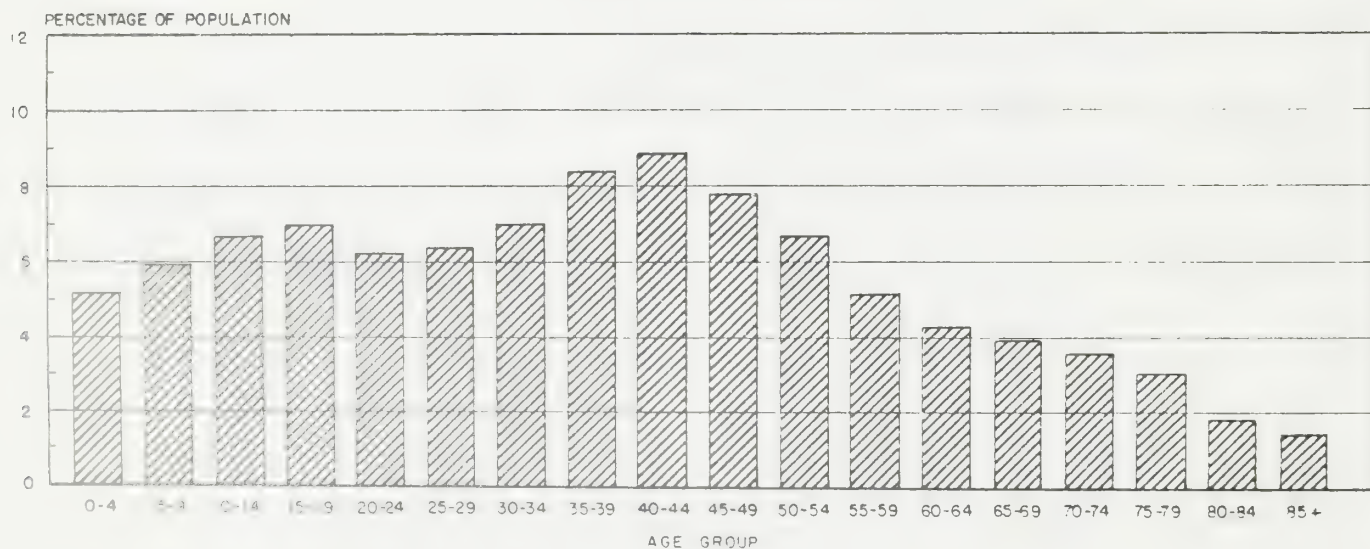
REGIONAL POPULATION: AGE DISTRIBUTION - 1980

SOURCE: ASSESSMENT



PROJECTED REGIONAL POPULATION: AGE DISTRIBUTION - 2001

FROM 'MOST-LIKELY' PROJECTION



2.3.2 Area Municipal Projections

'Most Likely' area municipal projections to the year 2001 are summarized in Tables 3, 4, 5 and Figure 5. Table 3 also gives the High and Low confidence range values for each municipality. The following conclusions may be drawn from this information:

- Ancaster is projected to more than double its population by 2001.
- Ancaster is expected to have the highest growth rate in the Region with an average rate of nearly 4% compounded annually. This is twice the projected growth rate of Stoney Creek which has been the fastest growing municipality in recent years.
- Ancaster and Stoney Creek are forecast to increase their respective populations by about the same amount: 17,700 for Ancaster, and 17,400 for Stoney Creek. Together, the projected population increase of these two municipalities exceeds the Regional increase of 34,350.
- Very little population change is expected for Hamilton, Dundas or Glanbrook.
- Hamilton is expected to maintain its standing as the largest municipality, but, it is expected the population of Hamilton will represent about 10% less of the total Regional population in 2001 than it did in 1980.

TABLE 3

YEAR 2001
AREA MUNICIPAL POPULATION PROJECTIONS
(Rounded to Nearest 500)

<u>MUNICIPALITY</u>	<u>HIGH</u>	<u>LOW</u>	<u>'MOST-LIKELY'</u>
Ancaster	40,500	27,000	32,000
Dundas	23,000	18,000	20,000
Flamborough	34,000	27,000	29,500
Glanbrook	10,000	8,000	9,000
Hamilton	313,500	294,000	302,000
Stoney Creek	58,000	48,500	53,000

TABLE 4

'MOST-LIKELY' GROWTH RATES
(Rounded to the Nearest 500)

<u>MUNICIPALITY</u>	<u>1980 POPULATION</u>	<u>2001 POPULATION</u>	<u>% GROWTH COMPOUNDED ANNUALLY</u>	<u>ABSOLUTE GROWTH (%) 1980-2001</u>
Ancaster	14,294	32,000	+ 3.91	123.7
Dundas	19,501	20,000	+ 0.13	2.6
Flamborough	24,234	29,500	+ 0.96	21.7
Glanbrook	9,737	9,000	- 0.37	- 7.5
Hamilton	307,243	302,000	- 0.07	- 1.7
<u>Stoney Creek</u>	<u>35,639</u>	<u>53,000</u>	<u>+ 1.88</u>	<u>48.7</u>
REGION	410,648	445,000	+ 0.38	8.4

FIG. 5

1980 - 2001 POPULATION GROWTH

'MOST-LIKELY' PROJECTION

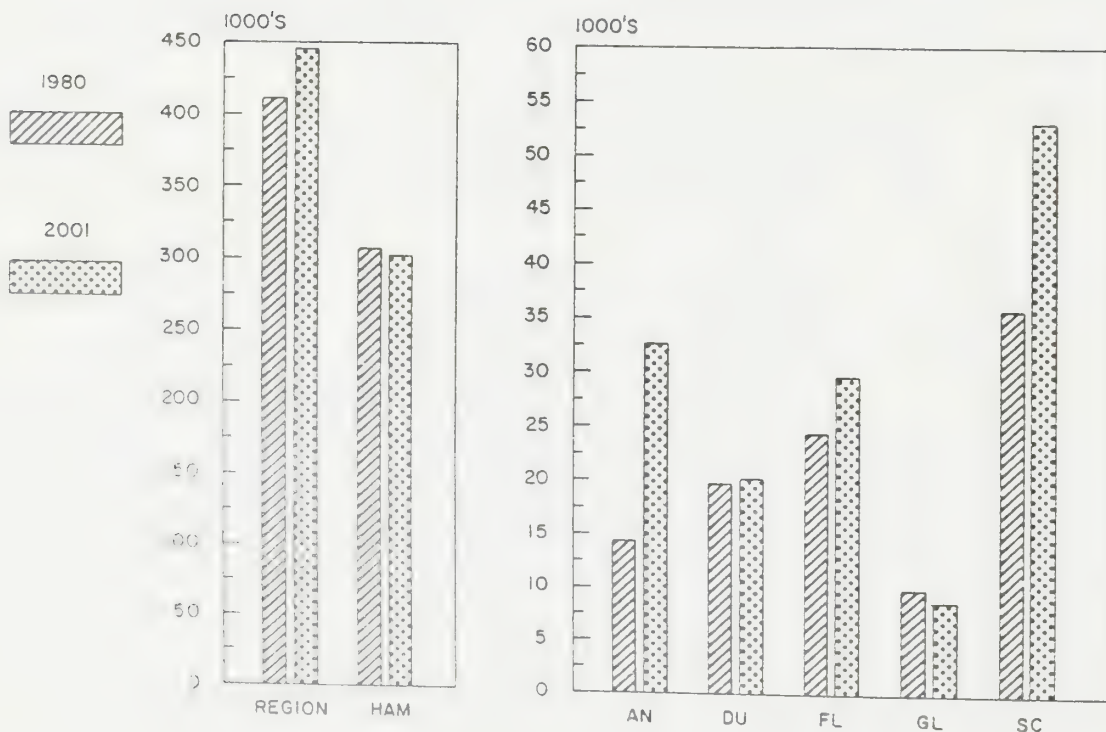


TABLE 5

PROPORTIONATE SIZE TO H-W REGION
'MOST-LIKELY' PROJECTION

<u>MUNICIPALITY</u>	<u>1980 (%)</u>	<u>2001 (%)</u>
Ancaster	3.5	7.1
Dundas	4.7	4.5
Flamborough	5.9	6.6
Glanbrook	2.4	2.0
Hamilton	75.1	67.9
Stoney Creek	<u>8.5</u>	<u>11.9</u>
	100.0	100.0

2.4 Conclusion

This study of future population in the Hamilton-Wentworth area has made use of the most recent demographic information and most sophisticated methods available.

Based on this information, and until such time as population growth characteristics show different trends, the figures shown in Tables 2 and 3 as 'Most-Likely' should be considered for planning purposes in the Hamilton-Wentworth Region.

PART TWO

BASIS OF POPULATION PROJECTION

1981 REVIEW

PART TWO: BASIS OF POPULATION PROJECTION - 1981 REVIEW

3.0 INTRODUCTION

The ability to predict future population is very much dependent on our ability to predict components of population change over time. Most important of these components of change are:

- births
- deaths
- migration

In theory, predictions of future growth patterns for these components can be made by the use of a mathematical projection model. Assumptions of future growth are made on the basis of observations of historical patterns for each component, adjusted to reflect changing trends.

As an example, statistics show that fertility rates have been declining for the last 20 years but that the rate of decline is decreasing in recent years. This observation is important to the prediction of future fertility rates. Where there is consistency in historical growth patterns, the task of future predictions will be simplified and looked on with confidence. But, when observed growth patterns are erratic, the projection task becomes more difficult and is less reliable.

Part Two of this report sets out in greater detail the assumptions made as input to the mathematical model used to determine the future population. Information is presented for each growth component, detailing historical trends and rates of change, alternative assumptions and the basis for the selected predictions.

Reliance on the projections must be tempered by the fact that accurate prediction is difficult given the history of erratic migration patterns and the number of different land use development patterns potentially available. To help overcome these problems of reliability, a range of population projections was developed and is presented. These are described as the High, Low, and 'Most-Likely' projections. The 'Most-Likely' projection is the one considered to have the greatest potential of achievement under the stated set of parameters.

In addition to Regional projections, area municipal population projections are presented. The municipal projections are direct derivatives of the Regional projection. That is, the Regional projections were determined first, followed by a secondary distribution to area municipalities made on the basis of historical patterns and assumed attractiveness predicted for each municipality. The attractiveness factor is mainly subjective in nature and is derived through an analysis of the relationship of assumptions representing possible government and private development decisions that will affect residential growth. The High, Low and 'Most-Likely' projections are introduced at the area municipality level to minimize the problem of reliability.

There are fewer subjective decisions involved in the production of the Regional population projections, therefore, they are more reliable than area municipal projections.

3.1 THE PROJECTION MODEL

The projections of population have been derived using a computer operated demographic age-cohort survival model. The model has the following characteristics:

- o It projects the population on a year by year basis.
- o It breaks the projected population down by single years of age, by sex and totals, for under 1, 1, 2, 3 to 84 and 85+.
- o It uses variable fertility rates per 1,000 women for single years of age, 15, 16, etc., to 49, for each year of the projection.
- o It uses variable death rates per thousand persons by sex, for single year ages under 1, 1, 2, 3, 4 etc., to 84 and 85+, for each year of the projection.
- o It uses variable number of net migrants each year by sex, for single years of age, under 1, 1, 2, 3 etc., to 84 and 85+.

This projection model is inherently more accurate than the methodology used in the 1976 projections because it uses age and sex-specific fertility and death rates instead of applying an overall birth rate and death rate to the population as a whole.

3.2 PROJECTION VARIABLES

The projection model was run for the Region and each of the 6 area municipalities. This report summarizes the results of 3 runs (Part One: Section 2) for each area, based on two alternative sets of fertility rates and three sets of net migration rates. The labels and associated variables for each were as follows:

<u>Assumption Variable</u>		
<u>Run Name</u>	<u>Fertility</u>	<u>Net Migration</u>
High	High	High
Low	Low	Low
'Most-Likely'	Low	'Most-Likely'

Also included in each projection is one set each of death rates, male birth ratios, and base year populations.

In the following sections, each of the 5 input variables to the model are listed, including the rationale by which they were established.

3.2.1 Base Populations

The "base" population is the population from which the age-cohort model starts its projection process. All model runs were made using 1979 assessment census data recorded by single years of age and sex as shown in Table 6. Minor modifications were made to the 1979 census to accommodate a known deficiency in the age group "under 1", and to assign ages to 12,200 Regional people whose age was recorded as "unknown" by the assessor.

Table 6 shows the base population used for the Regional projection; similar base population tables were used for each of the area municipalities.

TABLE 6

BASE YEAR (1979) POPULATION - REGION

AGE	MALE			FEMALE		
	1979 ASSESS.	ADJ.	TOTAL	1979 ASSESS.	ADJ.	TOTAL
U-1	2531*	74	2615	2425*	71	2496
1	2491	73	2564	2336	71	2407
2	2559	73	2632	2443	71	2514
3	2744	73	2817	2547	71	2618
4	2672	73	2745	2741	70	2811
5	2761	91	2852	2667	86	2753
6	2757	90	2847	2663	86	2749
7	2883	90	2973	2689	85	2774
8	2958	90	3048	2728	85	2813
9	3200	90	3290	3026	85	3111
10	3022	100	3122	2985	96	3081
11	3000	100	3100	2908	95	3003
12	3234	100	3234	3027	95	3122
13	3358	100	3458	3287	95	3382
14	3565	100	3665	3412	95	3507
15	3913	122	4035	3670	118	3788
16	3871	122	3993	3686	117	3803
17	3920	122	4042	3773	117	3890
18	3874	122	3996	3828	117	3945
19	4087	122	4109	4052	117	4169
20	3840	115	3955	3920	118	4038
21	3844	115	3959	3850	117	3967
22	3861	115	3976	3813	117	3930
23	3567	114	3681	3678	117	3795
24	3353	114	3467	3586	117	3703
25	3354	98	3452	3535	103	3638
26	3272	98	3370	3493	103	3596
27	3254	98	3352	3382	102	3484
28	3013	97	3110	3178	102	3280
29	3027	97	3124	2988	102	3090
30	3044	88	3132	3039	93	3132
31	2929	88	3017	3201	93	3294
32	3045	88	3133	3132	93	3225
33	2970	88	3058	3112	93	3105
34	2339	87	2426	2457	92	2549
35	2376	74	2450	2446	74	2520
36	2506	73	2579	2538	73	2611
37	2419	73	2492	2425	73	2498
38	2177	73	2250	2244	73	2317
39	2231	73	2304	2191	73	2264

* Under 1 population adjusted

Notes: Figures adjusted to include 12,200 persons of 'Unknown Age'

Source: Ministry of Revenue, Assessment Division

TABLE 6 (Continued)

AGE	MALE			FEMALE		
	1979 ASSESS.	ADJ.	TOTAL	1979 ASSESS.	ADJ.	TOTAL
40	2164	66	2230	2222	46	2268
41	2085	66	2151	2218	46	2264
42	2011	66	2077	2110	46	2256
43	2176	66	2242	2145	46	2191
44	2077	65	2142	2162	45	2207
45	2077	69	2146	2190	71	2161
46	2208	69	2277	2140	71	2211
47	2234	68	2302	2306	71	2376
48	2160	68	2228	2312	71	2383
49	2424	68	2492	2368	70	2438
50	2243	74	2317	2428	78	2506
51	2331	73	2404	2406	78	2484
52	2373	73	2446	2425	78	2503
53	2389	73	2462	2554	78	2632
54	2391	73	2464	2683	78	2761
55	2397	71	2468	2552	74	2626
56	2394	71	2465	2417	73	2490
57	2251	71	2322	2397	73	2470
58	2269	71	2340	2339	73	2412
59	2196	70	2266	2252	73	2325
60	1739	49	1788	1832	52	1884
61	1652	49	1701	1722	51	1773
62	1502	49	1551	1640	51	1691
63	1538	49	1587	1659	51	1710
64	1599	48	1647	1609	51	1660
65	1636	42	1678	1798	49	1847
66	1446	42	1488	1587	49	1636
67	1408	42	1450	1553	49	1602
68	1170	42	1212	1536	49	1585
69	1191	41	1232	1524	48	1572
70	1093	30	1123	1454	39	1493
71	1044	29	1073	1402	39	1441
72	918	29	927	1263	39	1302
73	884	29	913	1172	39	1211
74	860	29	889	1159	39	1198
75	740	20	760	1128	32	1160
76	741	20	761	1070	32	1102
77	656	20	676	962	32	994
78	576	19	575	906	32	938
79	586	19	605	896	31	927
80	481	10	491	817	20	837
81	360	10	370	785	20	805
82	320	10	330	609	20	629
83	292	10	302	542	19	561
84	252	9	261	550	19	559
85+	1053	36	1089	2630	85	2715

3.2.2 Fertility Rates

Table 7 shows Ontario fertility rates for 5 year age groups from 1931 to 1978. As the table indicates, fertility rates have been generally declining since the late 1950's. Figure 6 shows the total net fertility experienced in Ontario from 1931 to 1978. Total net fertility is the number of children a female could be expected to bear if she experiences the cited age-specific fertility rate for each year of her life. The chart shows that fertility in Ontario reached a previous low during the Great Depression and then increased dramatically, peaking at 3.9 in the late 1950's during a period commonly referred to as the "post war baby boom". Since 1960, the total net fertility has dropped dramatically to an unprecedented low of 1.7 in 1978. This figure of a 1.7 net fertility rate is less than half of the peak reached during the post war baby boom and is lower than the replacement level of 2.0. Table 8 shows the positive and negative factors that are currently affecting fertility rates and that may affect rates in the future. The table seems to show that the causal factors affecting fertility rates will likely continue to produce low fertility rates.

The high and low fertility rate used in the projections were developed from Ontario (Provincial) statistics. The number of births by single years of age of mother was obtained from the Ontario Registrar General's annual publication - Vital Statistics. The Ontario population by single years of age and sex was obtained from the Statistics Canada Publication "Estimates of Population by Sex and Age for Canada and the Provinces".

Low Fertility Projection

Three assumptions were made in estimating the low fertility rate:

1. Fertility will continue to decline at a slow rate until 1991 and then will remain constant to 2001. Current trends show a continual decline in fertility rates in all age groups in Ontario, but the rate of decline appears to be slowing. It seems apparent that continued rapid declines in fertility are unlikely in the future.
2. Fertility will decline more rapidly in the lower (below 18) and upper (above 35) age groups than in the total population due to the increasing ability of women to select the age of childbearing.
3. The average age of childbearing will increase due to the trend toward the postponement of childbearing.

FERTILITY RATES OF WOMEN BY SEVEN FIVE-YEAR AGE GROUPS, ONTARIO
ANNUALLY, 1931-1978
(per 1,000 WOMEN)

Table 7

Year	(General Fertility Rate)							15-49	(Total Fertility Rate)
	15-19	20-24	25-29	30-34	35-39	40-44	45-49		
1931	29.9	137.1	175.1	145.3	103.1	44.0	5.5	93.6	3.2
1932	28.7	129.6	168.3	140.6	100.5	43.7	5.5	90.3	3.1
1933	27.4	117.8	155.6	132.8	94.9	39.3	5.1	84.2	2.9
1934	26.2	113.1	151.2	133.1	93.0	39.2	4.9	82.5	2.8
1935	26.5	112.5	148.5	128.6	92.6	37.3	4.9	81.5	2.8
1936	25.7	112.1	144.3	126.5	90.0	36.3	4.4	79.8	2.7
1937	25.6	113.6	142.2	123.4	85.3	34.7	4.2	78.7	2.6
1938	26.9	121.2	145.3	123.9	84.8	34.0	4.1	80.7	2.7
1939	27.2	119.7	144.0	120.4	83.0	32.6	3.9	79.6	2.7
1940	29.3	130.3	152.6	122.8	81.7	32.7	3.7	83.7	2.8
1941	30.7	138.4	159.8	122.3	80.0	31.6	3.7	86.6	2.8
1942	32.0	145.1	168.7	128.0	83.0	32.3	3.6	91.1	3.0
1943	32.1	146.8	175.4	131.9	86.5	31.9	3.5	93.8	3.0
1944	31.3	143.3	168.7	134.1	88.1	33.0	3.4	92.8	3.0
1945	31.6	143.3	166.8	134.3	90.3	33.5	3.7	93.2	3.0
1946	36.5	169.6	191.4	146.0	93.1	34.5	3.8	105.0	3.4
1947	42.6	189.1	206.4	150.5	93.1	34.1	3.3	112.4	3.6
1948	43.2	181.1	197.6	141.4	89.0	32.6	3.3	107.5	3.4
1949	45.2	181.5	201.2	139.7	88.8	31.5	3.2	108.0	3.5
1950	46.0	181.3	200.6	141.3	87.9	30.8	3.0	107.7	3.5
1951	48.1	188.7	198.8	144.5	86.5	30.9	3.1	109.2	3.6
1952	50.4	201.0	205.2	150.7	87.4	30.7	2.8	113.0	3.7
1953	52.0	208.2	208.4	153.2	88.1	31.2	2.9	114.8	3.8
1954	54.3	217.4	213.2	156.5	88.5	32.4	3.2	117.2	3.8
1955	54.2	218.3	215.1	153.8	89.8	32.3	2.9	116.5	3.8
1956	55.9	222.2	220.1	150.3	89.6	30.8	2.9	116.6	3.9
1957	60.2	227.1	224.1	149.4	90.7	30.7	2.8	118.0	3.9
1958	59.2	226.5	223.3	147.9	87.6	28.9	2.7	115.8	3.9
1959	60.4	233.8	226.7	147.7	87.3	28.5	2.7	116.3	3.9
1960	59.8	233.5	224.4	146.2	84.2	28.5	2.4	114.1	3.8
1961	58.2	233.6	219.2	144.9	81.1	28.5	2.4	111.5	3.8
1962	55.0	231.6	214.6	143.1	77.1	27.6	2.1	108.3	3.7
1963	53.1	226.0	210.6	140.3	75.8	25.9	2.1	105.3	3.5
1964	50.2	212.8	203.1	134.9	72.0	25.1	2.1	100.2	3.1
1965	49.3	188.6	181.9	119.4	65.9	22.0	2.0	90.3	2.8
1966	48.2	169.1	163.5	103.3	57.5	19.1	1.7	81.5	2.6
1967	45.2	161.4	152.6	91.8	50.9	15.9	1.5	76.1	2.5
1968	43.0	152.6	148.7	86.3	44.8	13.8	1.4	72.9	2.4
1969	42.2	147.7	149.8	85.0	42.6	12.5	1.1	72.3	2.3
1970	42.8	143.3	147.2	81.8	39.0	11.3	0.9	71.2	2.2
1971	40.1	134.4	142.0	77.3	33.6	9.4	0.6	67.7	2.0
1972	38.5	119.8	137.1	72.1	28.9	7.8	0.6	63.4	1.9
1973	37.2	117.7	131.6	67.1	25.7	6.4	0.4	61.5	1.9
1974	35.3	113.1	131.1	66.6	23.0	5.5	0.4	60.6	1.9
1975	35.0	112.6	131.5	65.2	21.7	4.9	0.4	61.2	1.8
1976	33.4	110.3	129.9	65.6	21.1	4.3	0.3	60.3	1.8
1977	32.0	108.0	129.8	67.1	20.5	3.6	0.3	59.4	1.7
1978	28.1	96.4	122.4	66.5	18.9	3.3	0.2	54.7	1.7

Total Fertility Rate - sum of female age-specific fertility rates multiplied by five divided by 1000

Source: "Vital Statistics"

Metropolitan Toronto Planning Department
Research Division, December 1979

TOTAL NET FERTILITY RATE, ONTARIO 1931--78

FROM REGISTRAR GENERAL

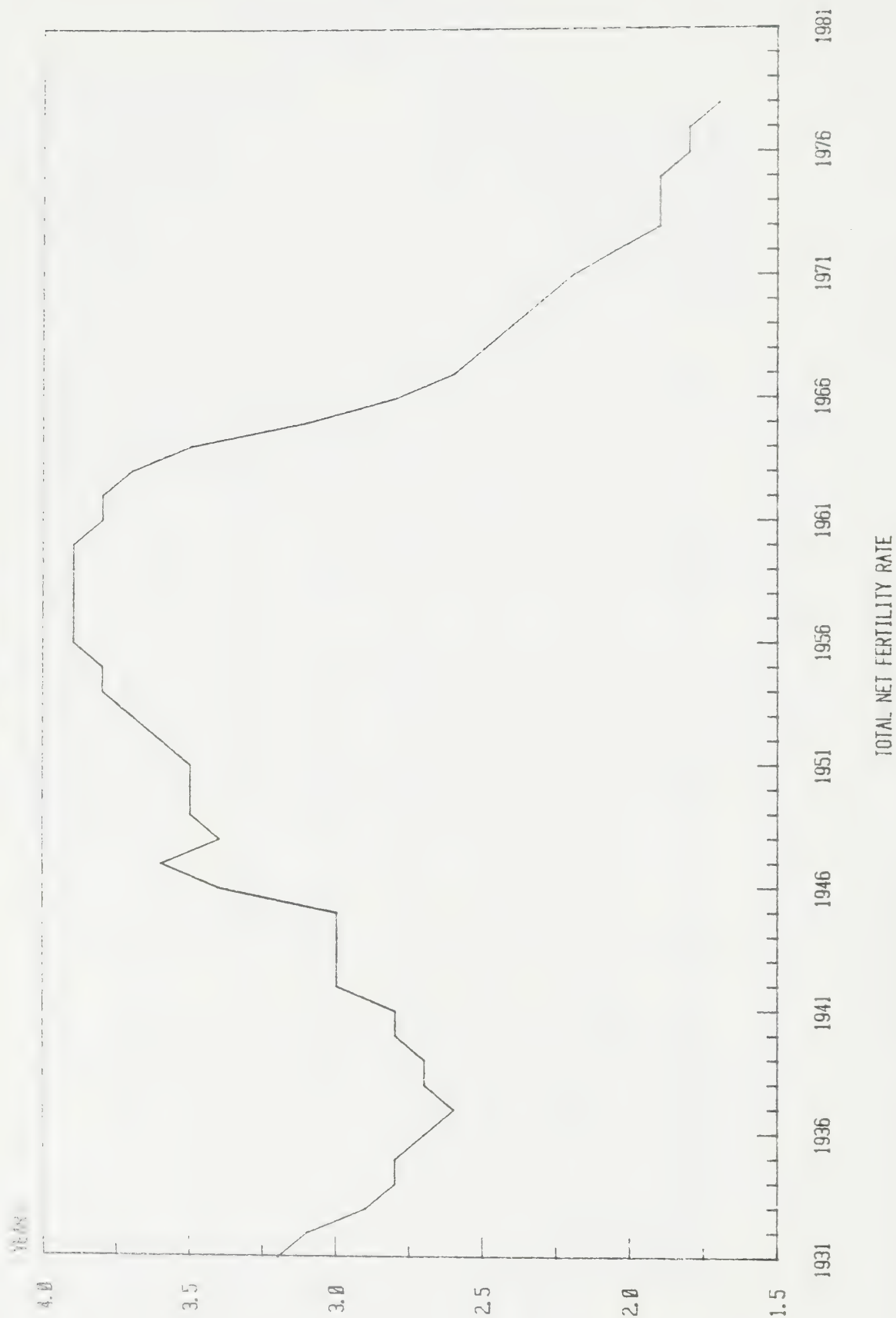


Figure 6

TABLE 8

POSITIVE AND NEGATIVE FACTORS INFLUENCING
THE FERTILITY RATE

<u>POSITIVE FACTORS</u>	<u>NEGATIVE FACTORS</u>
A) GOV'T PROGRAMS	A) ECONOMIC FACTORS
a) continued decline in birth rates may cause gov'ts to offer incentives for child birth (e.g. economic)	a) continued high inflation
	b) need for two income households
	c) high rate of unemployment
B) SOCIAL FACTORS	B) SOCIAL FACTORS
a) possible reversal of social trends outlined opposite	a) the trend of delaying childbirth to a later period in the life cycle may result in no children or smaller families
b) medical advances may allow for older age of childbirth	b) feminism - increase in female career orientation
c) increased acceptance of child rearing outside of the home	c) increased education - direct relationship with no children or smaller families
	d) widespread use of birth control
	e) decrease in marriage rate
	f) increase in divorce rate
	g) general trend toward smaller families
	h) increased desire for higher standard of living
	i) narrower spacing of age of childbirth 18-32 year old average for mothers

Table 9 shows the low fertility rates used to prepare the "low" population projections.

On producing these projected rates, a figure for the 1991 "levelling off point" was selected based on the assumption that total net fertility will not drop below 1.5. This figure has been widely cited as the probable "base" figure for North America and is lower than the replacement level of 2.0.*

High Fertility Projection

The assumptions used in making the high fertility rates projections are as follows:

1. The fertility rate will continue to decline until 1991, after which it will slowly increase until 2006. If a reversal in the trend toward decreasing fertility rates occurs, it will not occur for some time and will be reflected in slower rates of decline in the short term, and slow rates of increase in the long term.
2. In spite of a reversal in fertility rate trends, the fertility rates for the population under 19 and over 40 will remain relatively constant due to the increased preselection of the preferred age of childbearing.
3. The average age of childbearing will increase due to the trend of the postponement of childbearing.

The high fertility rates used in the high projections are shown in Table 10.

* Ministry of Treasury and Economics - Ontario Population Projections

Table 9 Low Fertility Estimates
Per Thousand Population

AGE	1981	1986	1991	1996	2001	2006
15	4.44	4.22	4	4	4	4
16	14.48	13.74	13	13	13	13
17	28.77	26.39	25	25	25	25
18	41.84	39.42	37	37	37	35
19	60.37	59.19	58	58	58	58
20	73.49	71.74	70	70	70	70
21	90.99	89.00	87	87	87	87
22	100.90	98.45	96	96	96	96
23	114.89	112.44	110	110	110	110
24	123.61	120.80	118	118	118	118
25	128.00	125.50	122	122	122	122
26	129.79	127.40	125	125	125	125
27	125.76	122.88	120	120	120	120
28	119.26	116.63	114	114	114	114
29	104.75	102.38	100	100	100	100
30	89.51	87.26	85	85	85	85
31	76.04	71.52	67	68	68	68
32	59.67	56.34	53	53	53	53
33	48.69	45.85	43	43	43	43
34	35.93	33.96	32	32	32	32
35	28.15	26.08	24	24	24	24
36	23.57	21.79	20	20	20	20
37	16.61	15.30	14	14	14	14
38	13.19	12.10	11	11	11	11
39	10.21	9.10	8	8	8	8
40	6.23	5.61	5	5	5	5
41	3.69	3.34	3	3	2	2
42	2.71	2.36	2	2	2	2
43	1.75	1.63	1.5	1.5	1.5	1.5
44	.92	.83	.75	.75	.75	.75
45	.45	.40	.35	.35	.35	.35
46	.28	.24	.20	.20	.20	.20
47	.1	.1	.1	.1	.1	.1
48	.1	.1	.1	.1	.1	.1
49	0	0	0	0	0	0
Total net Fertility	1.679	1.624	1.569	1.569	1.569	1.569

High Fertility Estimates
Per Thousand Population

Table 10

AGE	1981	1986	1991	1996	2001	2006
15	4.44	4.22	4.22	4.22	4.22	4.22
16	14.48	13.74	13.74	13.74	13.74	13.74
17	28.77	26.39	26.39	26.39	26.39	26.39
18	41.84	39.42	39.42	39.42	39.42	39.42
19	60.37	59.19	64.32	69.52	74.73	80.00
20	73.49	71.74	78.81	85.87	92.34	100.00
21	90.99	89.00	95.50	102.00	108.50	115.00
22	100.90	98.45	105.09	111.73	118.36	125.00
23	114.89	112.44	116.83	121.22	125.61	130.00
24	123.61	120.80	124.35	127.90	131.45	135.00
25	128.00	125.50	129.13	132.75	136.38	140.00
26	129.79	127.40	131.80	136.20	140.60	145.00
27	125.76	122.80	129.65	136.43	143.22	150.00
28	119.26	116.63	122.47	128.32	134.16	140.00
29	104.75	102.38	108.04	113.69	119.35	125.00
30	89.51	87.26	92.95	98.63	104.32	110.00
31	76.04	71.52	78.64	85.76	92.88	100.00
32	57.67	56.34	61.01	65.67	70.34	75.00
33	48.69	45.85	46.89	47.93	48.96	50.00
34	35.93	33.96	35.47	36.98	38.49	40.00
35	28.15	26.08	27.06	28.04	29.02	30.00
36	23.57	21.79	22.59	24.00	24.20	25.00
37	16.61	15.30	16.48	17.65	18.82	20.00
38	13.19	12.10	12.83	13.55	14.28	15.00
39	10.21	9.10	9.33	9.55	9.78	10.00
40	6.23	5.61	5.61	5.61	5.61	5.61
41	3.69	3.34	3.34	3.34	3.34	3.34
42	2.71	2.36	2.36	2.36	2.36	2.36
43	1.75	1.63	1.63	1.63	1.63	1.63
44	.92	.83	.83	.83	.83	.83
45	.45	.40	.40	.40	.40	.40
46	.28	.24	.24	.24	.24	.24
47	.1	.1	.1	.1	.1	.1
48	.1	.1	.1	.1	.1	.1
49	0	0	0	0	0	0
Total net Fertility	1.75	1.62	1.708	1.792	1.874	1.958

3.2.3 Proportion of Male Births

Table 11 - shows the proportion of males born in Ontario and in Hamilton-Wentworth from the years 1970 - 1977. The average of the two figures (51.3%) was used in both the high and low population projections for the Region and its area municipalities. It is assumed that no change in this rate of male births will take place over the forecast period.

TABLE 11

PROPORTION OF MALE BIRTHS
ONTARIO AND HAMILTON-WENTWORTH
1970 - 1977

<u>YEAR</u>	<u>ONTARIO</u>	<u>HAMILTON-WENTWORTH</u>
1970	51.36%	51.65%
1971	51.46	51.88
1972	51.58	51.37
1973	51.44	50.82
1974	51.42	51.15
1975	51.22	50.62
1976	51.03	50.97
1977	<u>51.36</u>	<u>51.57</u>
AVERAGE		
1970-77	51.36%	51.25%

3.2.4 Death Rates

Tables 12 and 13 show death rates by age group and sex for Canada, from 1921 to 1977. The tables show that since 1929 there has been an almost continual decline in death rates. The most significant decline in death rates has occurred in the under 1 and over 70 years age group. However, the tables also show that the decline in death rates is becoming less pronounced and appears to be reaching more constant levels.

Tables 14 and 15 show Ontario averages of death rates for 1971 - 1977 for single years of age and sex, and the projected rates used in the population projections.

Since the majority of the death rates involve only a small number of deaths per thousand, the Ontario averages were, for the most part, not changed to reflect downward trends in death rates. The death rates for the age cohorts under 1 year, 1 year and 65+ years were the exceptions to this general rule and were adjusted downward to reflect the more significant decline in death rates experienced by these groups. The declining death rate curves were plotted to determine the death rates to be used for these age cohorts.

One set of projected death rates was used as a constant throughout the forecast period.

Table 12

DEATH RATES BY FIVE YEAR AGE GROUPS BY SEX, CANADA, ANNUALLY 1921-1977

	MALE																			
Year	Under-1	1-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-84	85+	
1921	98.2	7.9	3.1	2.1	3.1	3.7	4.0	3.8	4.7	5.6	7.3	9.8	15.2	21.9	33.4	56.9	89.4	133.8	221.5	
1922	97.3	7.3	2.8	2.1	2.8	3.7	3.8	3.9	4.6	5.6	7.2	9.8	15.9	22.2	37.0	60.0	91.4	144.4	241.5	
1923	98.2	7.1	2.5	2.0	3.0	3.4	3.8	3.9	4.7	5.8	7.0	9.8	16.2	23.7	38.3	59.9	92.9	154.4	251.5	
1924	86.1	6.9	2.3	2.0	2.7	3.4	3.2	3.5	4.3	5.4	7.0	9.4	14.2	22.5	36.6	57.1	90.0	150.8	231.5	
1925	86.7	6.2	2.3	2.0	2.6	3.4	3.3	3.4	4.1	5.3	6.8	9.4	14.6	22.1	36.8	56.8	92.2	145.9	221.5	
1926	112.9	9.0	2.5	2.1	2.9	3.5	3.5	3.7	4.8	5.9	7.4	10.1	15.7	23.7	38.1	62.6	101.6	152.5	251.5	
1927	104.0	8.6	2.7	2.2	2.8	3.6	3.9	3.8	4.6	5.6	7.4	10.3	16.2	23.6	37.6	59.0	94.8	137.7	241.5	
1928	99.0	7.9	2.6	2.1	3.0	3.7	3.9	3.9	4.8	6.1	8.0	10.7	16.5	24.7	39.7	60.6	101.4	147.4	251.5	
1929	102.0	9.1	2.7	2.0	3.1	3.7	3.9	3.7	4.8	6.1	8.1	11.2	15.9	24.7	40.4	60.0	97.8	153.4	261.5	
1930	98.4	7.9	2.6	1.7	2.8	3.7	3.7	3.5	4.6	5.8	7.7	10.8	15.7	23.2	37.4	58.0	93.2	141.3	241.5	
1931	94.4	6.8	2.2	1.5	2.5	3.2	3.4	3.4	4.2	5.4	7.2	10.7	15.4	22.9	35.2	55.0	87.4	134.1	221.5	
1932	81.5	6.0	1.9	1.5	2.3	3.0	3.1	3.1	4.4	5.2	6.8	10.3	15.4	23.2	36.4	58.6	93.4	151.3	241.5	
1933	81.7	5.5	1.6	1.3	2.2	2.8	2.8	3.3	3.8	5.0	7.0	10.1	14.6	23.3	36.0	56.6	89.9	150.5	231.5	
1934	90.5	5.9	1.7	1.4	1.8	2.4	2.8	3.3	3.8	4.8	7.0	10.1	15.2	24.5	35.5	56.4	87.8	142.8	221.5	
1935	80.0	5.9	1.8	1.5	2.1	2.5	2.9	3.2	4.0	5.1	7.0	10.2	15.0	24.6	35.3	57.8	88.6	146.7	221.5	
1936	73.1	5.5	1.9	1.4	2.1	2.6	2.9	3.2	4.0	5.0	7.1	10.2	15.4	24.9	36.0	58.2	90.6	149.2	221.5	
1937	84.0	7.4	2.2	1.5	2.1	2.7	2.8	3.4	4.2	5.2	7.5	10.5	15.8	26.1	37.0	57.2	92.8	152.0	221.5	
1938	70.5	5.3	1.8	1.5	2.0	2.5	2.7	3.0	3.7	5.0	7.1	10.4	15.1	24.0	35.8	57.7	89.5	140.0	221.5	
1939	68.4	4.7	1.7	1.3	2.0	2.4	2.6	2.8	3.7	4.8	6.7	10.4	15.5	24.0	37.3	58.3	93.6	141.6	242.5	
1940	62.6	4.6	1.6	1.2	2.0	2.3	2.4	2.8	3.6	4.9	6.9	10.6	16.3	24.7	38.2	59.3	91.5	147.5	247.5	
1941	67.0	4.7	1.7	1.4	2.0	2.6	2.7	2.8	3.8	5.0	7.3	10.6	16.0	24.2	37.3	58.5	95.7	147.6	241.5	
1942	59.7	4.5	1.5	1.2	1.9	2.8	2.5	2.7	3.4	4.8	6.9	10.8	15.7	24.1	36.9	56.9	92.7	140.6	232.5	
1943	59.5	4.1	1.7	1.3	2.2	2.8	2.4	2.5	3.4	4.9	7.0	10.3	16.1	24.6	38.1	58.8	94.4	150.7	253.5	
1944	60.5	4.1	1.6	1.1	2.0	2.2	2.0	2.3	3.1	4.3	6.8	10.0	15.7	23.8	37.5	57.5	89.6	139.7	235.5	
1945	56.6	3.1	1.3	1.1	1.8	2.1	2.1	2.2	3.2	4.3	6.8	10.0	15.3	23.8	36.9	55.3	89.6	136.4	236.5	
1946	51.9	3.3	1.3	1.1	1.7	2.1	2.0	2.2	2.9	4.4	6.5	9.9	15.3	23.8	37.1	54.0	86.7	130.4	225.5	
1947	51.3	2.8	1.2	1.0	1.6	2.0	2.1	2.2	3.1	4.3	7.0	10.1	15.6	24.3	37.1	54.7	84.1	129.5	214.5	
1948	48.6	2.7	1.2	0.9	1.5	2.1	1.9	2.1	3.1	4.4	6.8	10.3	15.7	24.7	36.0	55.7	84.8	130.7	215.5	
1949	48.2	2.4	1.1	0.9	1.5	1.9	1.9	2.1	2.8	4.1	6.8	10.1	15.3	25.2	36.5	56.2	82.4	133.4	220.5	
1950	46.2	2.2	1.0	0.8	1.4	1.7	1.7	1.9	2.6	4.0	6.6	10.0	15.6	25.1	36.4	54.9	84.7	132.2	222.5	
1951	42.7	2.1	1.0	0.8	1.4	1.9	1.8	2.1	2.5	3.9	6.4	10.4	16.2	24.5	35.1	54.5	87.6	135.5	235.5	
1952	42.5	2.2	1.0	0.8	1.4	1.9	1.8	2.1	2.6	3.9	6.3	10.6	16.3	24.5	35.6	52.3	83.3	132.5	223.5	
1953	39.8	1.9	1.0	0.8	1.4	1.9	1.7	2.0	2.6	3.9	6.2	10.4	15.7	24.2	35.3	53.6	82.9	129.5	219.5	
1954	35.8	1.7	0.8	0.7	1.2	1.7	1.6	1.8	2.3	3.6	5.7	10.0	15.0	24.1	35.0	51.7	80.6	126.2	218.5	
1955	35.0	1.7	0.8	0.7	1.3	1.7	1.6	1.8	2.2	3.5	5.7	9.8	15.1	23.9	35.9	53.2	84.8	132.4	219.5	
1956	35.0	1.6	0.8	0.6	1.2	1.7	1.6	1.8	2.3	3.4	5.8	9.6	15.5	24.0	35.7	53.4	82.8	132.6	221.5	
1957	34.5	1.6	0.7	0.6	1.3	1.7	1.7	1.8	2.3	3.7	6.1	9.9	16.0	25.5	37.4	53.3	84.1	133.5	223.5	
1958	33.7	1.4	0.7	0.6	1.2	1.5	1.6	1.7	2.3	3.6	5.9	9.9	15.8	24.4	36.6	52.8	81.6	131.8	224.5	
1959	31.8	1.3	0.8	0.6	1.2	1.7	1.6	1.7	2.2	3.5	5.8	9.5	15.6	24.2	36.6	55.7	83.6	133.1	234.5	
1960	30.8	1.3	0.7	0.6	1.3	1.6	1.5	1.6	2.3	3.3	6.0	9.3	15.6	24.0	35.0	54.3	83.2	128.5	217.5	
1961	30.5	1.3	0.6	0.6	1.2	1.7	1.5	1.6	2.3	3.4	5.8	9.6	15.2	24.0	35.7	54.0	81.8	125.1	209.5	
1962	30.6	1.2	0.6	0.5	1.1	1.7	1.5	1.6	2.3	3.4	5.6	9.5	15.4	23.9	35.1	54.1	81.0	123.3	209.5	
1963	29.6	1.2	0.7	0.5	1.1	1.8	1.6	1.6	2.3	3.4	5.7	9.5	15.5	24.1	35.4	53.9	83.2	124.5	214.5	
1964	27.8	1.1	0.6	0.5	1.2	1.8	1.5	1.7	2.2	3.7	5.7	9.5	15.1	25.0	35.3	53.4	81.3	121.0	200.5	
1965	26.2	1.0	0.7	0.5	1.2	1.8	1.6	1.7	2.2	3.5	5.6	9.7	15.2	24.2	35.6	53.7	83.3	123.9	211.5	
1966	25.8	1.1	0.6	0.6	1.3	1.8	1.6	1.7	2.2	3.4	5.7	9.7	15.4	24.0	36.2	53.1	79.9	124.0	211.5	
1967	24.2	1.1	0.6	0.6	1.3	1.9	1.5	1.6	2.2	3.6	5.8	9.6	15.3	24.0	36.1	52.0	80.2	120.1	209.5	
1968	22.9	1.0	0.6	0.5	1.3	1.8	1.5	1.7	2.2	3.5	5.8	9.1	15.1	23.4	36.9	52.6	80.5	125.4	211.5	
1969	21.7	1.0	0.6	0.5	1.3	1.9	1.6	1.6	2.3	3.4	5.7	9.4	15.0	23.0	36.6	53.3	78.2	121.6	206.5	
1970	21.2	0.9	0.6	0.5	1.3	1.7	1.4	1.6	2.2	3.5	5.6	9.3	14.8	23.7	36.3	53.3	78.2	119.7	197.5	
1971	19.9	0.9	0.6	0.5	1.4	1.8	1.5	1.6	2.2	3.6	5.7	9.3	14.6	22.9	34.7	51.9	79.0	118.8	198.5	
1972	19.0	1.0	0.5	0.5	1.6	2.0	1.5	1.7	2.2	3.6	5.6	9.3	14.6	23.0	35.7	53.4	78.9	122.7	213.5	
1973	17.4	0.8	0.5	0.5	1.7	2.1	1.5	1.6	2.3	3.6	5.8	9.2	15.0	23.0	34.7	52.0	79.6	121.9	218.5	
1974	16.6	0.9	0.5	0.5	1.7	2.0	1.6	1.5	2.3	3.5	5.8	9.2	14.6	22.7	34.9	53.1	78.3	121.5	217.5	
1975	15.9	0.9	0.5	0.5	1.6	1.9	1.5	1.6	2.2	3.4	5.5	9.1	14.4	22.4	34.4	51.4	77.2	120.1	221.5	
1976	15.0	0.8	0.4	0.4	1.4	1.8	1.5	1.5	2.0	3.2	5.6	8.9	14.3	22.1	33.3	51.4	77.3	118.2	195.5	
1977	13.5	0.7	0.5	0.4	1.5	1.9	1.5	1.5	2.2	3.3	5.5	8.9	13.9	22.0	32.9	50.6	75.5	113.9	186.5	

Table 13

DEATH RATES BY FIVE YEAR AGE GROUPS BY SEX, CANADA, ANNUALLY 1921-1977

FEMALE

	Under-1	1-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-84	85+
1921	77.4	6.9	2.7	1.9	2.7	3.7	4.1	4.5	5.5	5.9	7.1	10.2	13.5	19.7	33.2	52.8	80.9	122.4	224.9
1922	75.9	6.5	2.4	1.9	2.6	3.8	4.2	4.6	5.5	6.0	7.6	9.7	13.9	20.2	32.8	53.3	88.3	135.2	237.2
1923	77.4	6.5	2.4	1.7	2.6	3.5	3.9	4.4	5.5	5.7	7.4	9.7	14.5	21.4	34.6	55.4	93.4	144.2	256.9
1924	70.5	5.9	2.2	1.8	2.5	3.5	3.7	4.2	5.0	5.5	6.8	9.6	12.7	20.1	32.1	51.1	80.2	129.9	247.8
1925	70.0	5.6	1.7	1.6	2.4	3.5	3.6	3.8	4.6	5.4	6.5	8.8	12.7	20.1	32.6	51.0	82.6	136.5	251.5
1926	90.0	9.2	2.1	1.8	2.9	4.0	4.1	4.6	5.6	6.1	7.5	9.5	13.5	21.0	35.0	54.0	92.8	144.5	274.3
1927	83.3	7.6	2.4	2.0	3.0	4.0	4.1	4.3	5.4	5.8	7.3	9.3	13.3	20.6	33.3	49.3	85.7	133.1	252.8
1928	79.6	7.0	2.3	1.9	2.7	4.0	4.2	4.6	5.4	6.1	7.4	9.8	14.2	21.2	33.0	54.3	88.8	143.3	267.3
1929	81.5	8.0	2.5	1.9	2.8	4.0	4.3	4.6	5.4	6.2	7.3	9.8	13.8	21.8	35.1	55.5	91.2	143.2	256.0
1930	79.7	6.9	2.0	1.6	2.8	3.6	4.1	4.1	4.9	6.0	7.1	9.3	13.7	20.1	32.8	50.7	82.6	132.8	233.5
1931	74.4	6.1	1.7	1.5	2.2	3.2	3.8	4.2	4.8	5.0	6.6	9.0	13.4	20.7	30.3	49.1	82.9	127.1	212.6
1932	64.5	5.1	1.5	1.4	2.1	3.0	3.6	4.0	4.7	5.4	6.8	9.3	13.6	20.2	32.0	51.9	86.6	141.2	237.8
1933	64.0	4.6	1.3	1.2	1.9	2.8	3.4	3.9	4.4	5.1	6.8	9.2	13.3	20.5	32.3	50.5	83.5	135.6	227.9
1934	62.5	5.0	1.3	1.1	1.9	2.7	3.1	3.7	4.2	4.7	6.5	8.8	12.9	20.2	30.3	48.8	78.4	131.9	209.7
1935	61.6	5.2	1.5	1.3	1.8	2.7	3.3	3.6	4.5	4.9	6.5	8.7	12.9	20.3	31.1	49.9	80.1	137.3	215.0
1936	58.8	4.8	1.7	1.2	1.9	2.8	3.1	3.8	4.5	4.9	6.3	9.2	12.9	20.7	31.1	50.8	81.4	133.1	218.1
1937	67.1	6.2	1.8	1.3	1.9	2.7	3.1	3.7	4.3	5.1	6.5	9.2	12.7	20.4	29.8	51.4	80.8	136.5	222.7
1938	55.6	4.5	1.6	1.2	1.7	2.4	2.7	3.2	3.9	4.6	5.8	8.2	12.3	19.0	29.4	48.6	78.1	123.4	209.8
1939	52.7	4.0	1.4	1.1	1.6	2.1	2.6	3.1	3.8	4.3	5.8	8.5	12.2	19.5	30.4	49.0	80.4	131.0	230.9
1940	49.9	3.9	1.2	1.0	1.5	2.1	2.6	2.8	3.7	4.2	5.7	8.5	12.2	18.4	30.1	49.1	82.7	127.6	231.8
1941	51.9	4.0	1.3	1.0	1.5	2.0	2.5	2.8	3.4	4.5	6.0	8.1	12.3	18.5	30.4	47.0	79.7	131.2	229.3
1942	47.5	3.9	1.2	0.9	1.5	1.9	2.4	2.6	3.3	4.1	5.7	8.0	12.4	18.2	29.3	45.2	77.3	122.8	221.6
1943	47.5	3.4	1.2	1.0	1.4	2.0	2.3	2.5	3.4	4.1	5.7	8.1	12.1	18.6	29.9	47.8	91.8	134.6	237.7
1944	48.5	3.4	1.2	1.0	1.3	1.9	2.2	2.4	3.0	4.0	5.4	8.1	11.6	18.1	29.2	46.6	76.6	126.2	223.5
1945	45.7	2.7	1.0	0.8	1.2	1.6	1.9	2.4	3.0	3.6	5.3	7.7	11.2	17.6	27.2	45.4	74.5	119.2	218.6
1946	41.1	2.8	1.1	0.8	1.3	1.8	1.9	2.1	2.7	3.6	5.3	7.4	11.3	16.7	27.4	44.3	71.9	119.3	213.8
1947	39.4	2.4	0.9	0.7	1.3	1.6	1.7	2.0	2.5	3.3	4.9	7.2	10.6	17.2	27.0	44.0	71.1	117.8	202.0
1948	38.5	2.3	0.7	0.6	1.0	1.4	1.5	1.8	2.5	3.4	4.8	7.3	10.9	16.9	26.3	43.7	72.2	116.7	212.2
1949	39.1	2.2	0.8	0.6	1.0	1.3	1.4	1.7	2.3	3.2	4.7	7.0	10.2	16.9	26.2	44.4	71.5	113.4	206.5
1950	36.5	1.8	0.7	0.6	0.8	1.0	1.2	1.4	2.2	3.2	4.7	6.6	10.1	16.1	26.4	42.8	69.9	115.3	209.1
1951	34.0	1.9	0.7	0.5	0.9	1.0	1.1	1.5	2.0	3.0	4.5	6.5	10.2	16.1	24.9	41.6	73.3	120.7	212.0
1952	33.6	1.8	0.7	0.5	0.7	0.9	1.0	1.4	1.9	2.8	4.4	6.5	9.6	15.4	23.9	40.5	66.6	109.8	201.0
1953	31.0	1.6	0.5	0.5	0.6	0.8	1.0	1.2	1.8	2.8	4.1	6.4	9.5	15.4	24.3	39.8	68.2	110.5	205.1
1954	27.9	1.4	0.5	0.4	0.6	0.7	0.9	1.2	1.7	2.7	3.9	6.1	8.8	14.5	23.0	37.4	64.5	103.3	200.8
1955	27.5	1.3	0.5	0.4	0.6	0.6	0.8	1.1	1.5	2.3	3.7	5.6	9.0	14.2	22.6	37.2	65.4	102.0	203.9
1956	28.7	1.4	0.5	0.4	0.5	0.6	0.8	1.0	1.5	2.4	3.7	5.7	8.8	14.8	22.3	37.0	66.8	110.5	198.3
1957	27.2	1.3	0.5	0.4	0.6	0.7	0.9	1.0	1.4	2.3	3.9	5.5	9.3	14.4	23.3	36.5	64.3	110.0	197.5
1958	26.4	1.2	0.4	0.4	0.6	0.6	0.7	1.0	1.5	2.3	3.4	5.4	8.5	13.7	22.2	35.2	62.4	106.2	197.8
1959	24.7	1.2	0.5	0.4	0.5	0.6	0.8	1.0	1.5	2.1	3.4	5.6	8.7	13.4	22.0	36.9	63.6	108.9	203.6
1960	23.7	1.1	0.4	0.3	0.5	0.6	0.7	0.9	1.4	2.1	3.5	5.3	8.2	13.4	21.3	35.1	60.8	104.1	199.6
1961	23.7	1.0	0.4	0.3	0.5	0.6	0.7	0.9	1.4	2.0	3.2	5.3	8.0	12.8	21.4	34.2	59.2	101.2	192.2
1962	24.3	1.0	0.4	0.3	0.5	0.6	0.7	0.9	1.4	2.1	3.4	5.1	8.2	12.8	20.7	34.2	57.8	99.5	194.6
1963	22.9	0.9	0.4	0.3	0.6	0.6	0.7	0.9	1.3	2.1	3.3	5.2	7.9	13.1	20.6	34.2	58.7	101.9	192.1
1964	21.4	0.9	0.4	0.3	0.5	0.6	0.6	0.9	1.3	2.0	3.2	5.1	7.8	12.8	20.0	32.4	56.7	95.3	176.0
1965	20.8	0.9	0.4	0.3	0.5	0.6	0.6	0.9	1.3	2.0	3.3	5.3	7.7	12.3	19.5	32.6	56.3	95.5	185.5
1966	20.2	0.9	0.4	0.3	0.5	0.5	0.6	0.9	1.3	2.0	3.3	5.0	7.7	12.2	19.5	30.9	53.9	93.6	183.4
1967	19.6	0.8	0.4	0.3	0.5	0.6	0.6	0.9	1.3	2.1	3.2	5.0	7.8	11.9	18.9	30.3	51.3	90.3	175.8
1968	18.6	0.8	0.4	0.3	0.5	0.6	0.7	0.8	1.3	2.0	3.1	5.1	7.7	11.7	18.7	30.7	50.8	89.3	180.6
1969	16.9	0.8	0.4	0.3	0.5	0.6	0.6	0.9	1.3	2.1	3.4	4.9	7.6	11.5	18.4	29.8	50.1	86.4	171.6
1970	16.3	0.7	0.4	0.3	0.5	0.6	0.6	0.9	1.3	2.1	3.2	4.9	7.5	11.2	18.3	29.4	48.7	83.9	163.7
1971	15.1	0.8	0.4	0.3	0.6	0.6	0.6	0.9	1.3	2.1	3.0	4.6	7.2	11.0	17.3	28.3	48.1	82.4	163.3
1972	15.0	0.8	0.3	0.3	0.6	0.5	0.7	0.9	1.4	2.1	3.1	4.9	7.4	11.3	17.7	29.1	48.3	80.8	158.6
1973	13.6	0.7	0.3	0.3	0.6	0.6	0.6	0.8	1.3	2.0	3.1	4.8	7.5	11.2	16.9	28.0	47.8	80.8	157.0
1974	13.4	0.7	0.3	0.3	0.6	0.6	0.6	0.8	1.2	1.9	3.2	4.7	7.1	11.3	17.3	28.1	46.7	81.3	156.3
1975	12.6	0.7	0.3	0.3	0.5	0.6	0.6	0.8	1.2	2.0	3.2	4.5	7.1	10.8	17.3	27.7	45.5	77.1	149.1
1976	11.9	0.6	0.3	0.2	0.5	0.5	0.5	0.8	1.2	1.7	3.0	4.3	6.7	10.4	16.4	26.3	44.7	76.8	154.7
1977	11.2	0.6	0.3	0.3	0.5	0.5	0.6	0.7	1.1	1.8	3.0	4.5	6.8	10.2	16.1	26.1	42.4	73.5	148.7

Table 14

DEATH RATES - MALE

Deaths per thousand Population

AGE	ONT. AVG. 1971 - 77	PROJECTED RATE	AGE	ONT. AVG. 1971 - 77	PROJECTED RATE
0	15.83	10.0	37	1.92	2.0
1	.91	.5	38	2.22	2.2
2	.65	.5	39	2.57	2.6
3	.66	.5	40	2.48	2.5
4	.54	.5	41	2.83	2.8
5	.52	.5	42	3.16	3.2
6	.42	.4	43	3.66	3.7
7	.40	.4	44	3.84	3.8
8	.41	.4	45	4.45	4.5
9	.33	.3	46	4.93	5.0
10	.32	.3	47	5.53	5.5
11	.31	.3	48	6.29	6.3
12	.38	.4	49	6.39	6.4
13	.41	.4	50	7.18	7.2
14	.50	.5	51	8.26	8.3
15	.73	.7	52	8.95	9.0
16	1.07	1.1	53	10.18	10.2
17	1.45	1.5	54	11.04	11.0
18	1.79	1.8	55	11.81	11.8
19	1.81	1.8	56	13.50	13.0
20	1.87	1.9	57	14.95	14.9
21	1.74	1.7	58	16.37	16.3
22	1.44	1.5	59	17.61	17.6
23	1.51	1.5	60	19.47	19.4
24	1.42	1.4	61	20.41	20.4
25	1.36	1.4	62	23.45	23.4
26	1.28	1.3	63	25.42	25.4
27	1.17	1.3	64	27.18	27.1
28	1.27	1.2	65	30.41	30.4
29	1.15	1.2	66	32.28	32.2
30	1.23	1.2	67	36.25	36.2
31	1.31	1.3	68	38.24	38.2
32	1.29	1.3	69	43.00	42.9
33	1.36	1.4	70-74	54.09	52.0
34	1.62	1.6	75-79	81.10	72.1
35	1.62	1.6	80-84	123.08	116.4
36	1.77	1.8	85+	202.54	155.4

Table 15

DEATH RATES - FEMALE

Deaths per thousand Population

AGE	ONT. AVG. 1971 - 77	PROJECTED RATE	AGE	ONT. AVG. 1971 - 77	PROJECTED RATE
0	12.24	8.0	37	1.16	1.2
1	.85	.5	38	1.26	1.3
2	.65	.4	39	1.45	1.5
3	.42	.4	40	1.53	1.5
4	.33	.3	41	1.60	1.6
5	.34	.3	42	1.95	2.0
6	.33	.3	43	1.99	2.0
7	.24	.2	44	2.32	2.3
8	.26	.3	45	2.62	2.6
9	.21	.2	46	2.84	2.8
10	.22	.2	47	2.89	2.9
11	.25	.2	48	3.34	3.3
12	.22	.2	49	3.58	3.6
13	.26	.3	50	3.86	3.9
14	.29	.3	51	4.25	4.3
15	.38	.4	52	4.75	4.8
16	.47	.5	53	4.89	4.9
17	.52	.5	54	5.53	5.5
18	.52	.5	55	5.85	5.9
19	.49	.5	56	6.68	6.7
20	.52	.5	57	7.16	7.1
21	.52	.5	58	8.27	8.3
22	.48	.5	59	8.75	8.8
23	.41	.5	60	9.34	9.3
24	.48	.5	61	10.03	10.0
25	.51	.5	62	11.28	11.2
26	.48	.5	63	11.74	11.7
27	.54	.5	64	12.67	12.6
28	.58	.6	65	14.29	14.2
29	.50	.6	66	14.92	14.8
30	.70	.7	67	16.95	16.9
31	.64	.7	68	18.72	18.7
32	.76	.8	69	20.95	20.9
33	.78	.8	70-74	27.57	26.0
34	.85	.9	75-79	46.16	37.0
35	.96	1.0	80-84	79.37	70.0
36	1.08	1.1	85+	159.62	133.9

3.2.5 Migration

A two-step process was used to determine the net annual migration for the population projection model. Firstly, high, 'Most-Likely' and low projections of total net annual migration were established. This process is described in 3.2.5.1 of this section. Secondly, projected profiles of the age and sex of the migrants were made. These age and sex profiles were then applied to the projections of total net migration to obtain the number of migrants, by age and sex, for the 'High', the 'Low' and the 'Most-Likely' projections for each forecast year. This process is described in 3.2.5.2(Pg. 57) of this section.

3.2.5.1 Total Net Migration

Two separate methodologies were used to calculate migration rates, one for the Region as a whole and one for the area municipalities.

Regional Net Migration

Figure 7 illustrates the total net migration experienced by the Region from 1971 to 1980.* The Region's net migration can be broken down into three components:

- i) international migration to the Region;
- ii) inter-provincial migration between other provinces; and
- iii) the Region and intra-provincial migration which is composed of migration between Hamilton-Wentworth and other areas in the Province.

i) International Immigration

Figure 8 shows the net international immigration to Ontario from 1961 to 1980. As the chart shows, the level of international immigration to Ontario has been very irregular. The average immigration level to Ontario over the past ten years is approximately 42,000, although the levels in the past four years have been considerably lower.

The level of international immigration is controlled by the Federal Government, making predictions of future levels of international immigration difficult, because the level of migrants is primarily a political decision.

* The migration figures were calculated by subtracting births and deaths for each area from the total population increase for each year to give net migration.

H-W NET MIGRATION 1971-1980

FROM ASSESS. AND REG. GEN. (1980 EST.)

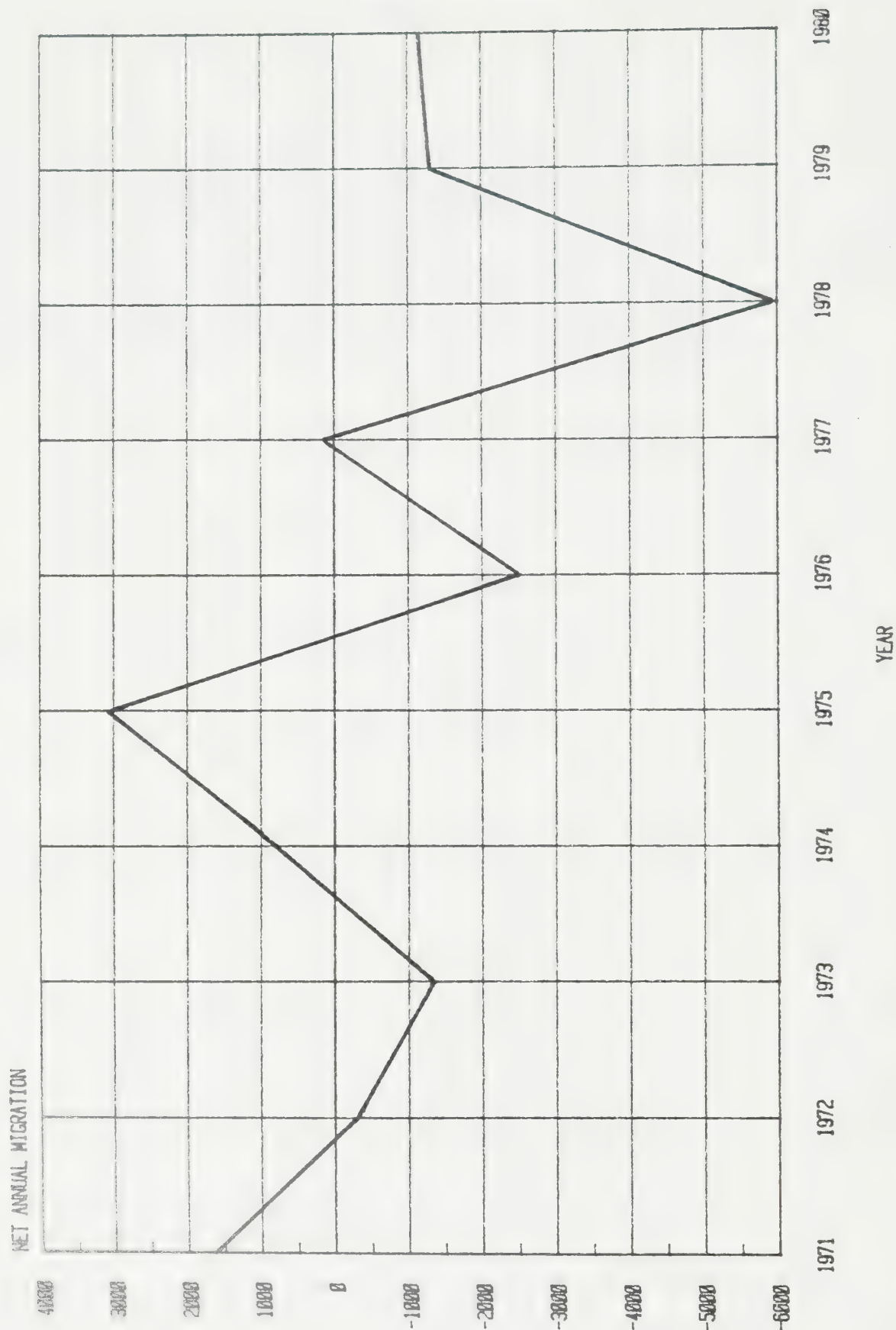


Figure 8

NET INTERNATIONAL IMMIGRATION TO ONT.

SOURCE: MINISTRY OF TREASURY AND ECON.



Figure 9 shows the proportion of international immigrants, immigrating to Ontario, who gave their intended destination as the Hamilton urban centre. For the purpose of this study, Hamilton is considered to be the centre cited for immigrants to the Region. The chart shows that there has been a gradual but steady decline in the number of immigrants destined for Hamilton. The average number of immigrants giving Hamilton as their destination has averaged 3.75% for the last 10 years, although the levels experienced in the past six years have been generally lower than this average.

The combination of these trends showing declining levels of net international immigrants to Ontario, and a declining proportion of these immigrants intending to settle in Hamilton, would seem to indicate that the total number of international migrants that can be expected to settle in the Region in the future will be substantially less than in the past.

ii) Inter-Provincial Migration

Figure 10 shows the net inter-provincial migration experienced by Ontario from 1961 to 1980. The chart shows that inter-provincial migration varies widely from year to year. However, taken on average over the last twenty years, net inter-provincial migration has been generally balanced with approximately the same number of persons leaving Ontario for other provinces as the number of persons arriving from other provinces. In five of the past six years Ontario has lost population to other provinces; for the most part to Alberta, British Columbia and Saskatchewan. The cause of this migration trend is probably the comparatively strong economy in the West. It is uncertain whether these economic trends will continue into the future. However, it is probably safe to assume that in the long run, Ontario's inter-provincial migration will be relatively balanced.

The effect of inter-provincial migration on the Region is not precisely known. For these projections, it has been assumed that inter-provincial migration affects the Region in the same way that it affects the Province; that is, that inter-provincial migration flows will be relatively balanced between the Region and other provinces. In other words, it is assumed that there will neither be a net gain nor loss to the Region as a result of inter-provincial migration.

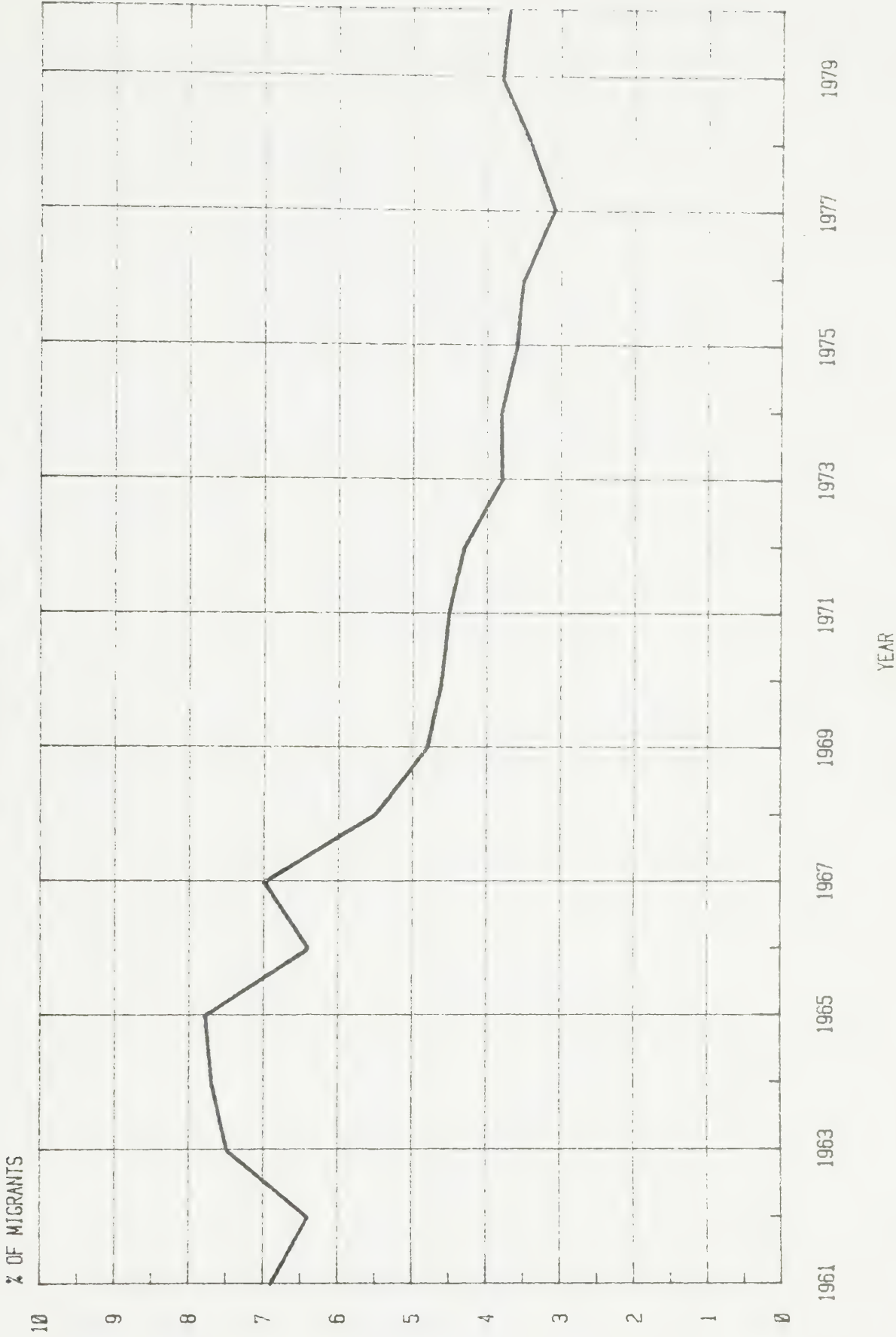
iii) Intra-Provincial Migration

Statistics Canada information shows that from 1971 to 1976, a net total of 7,420 people in the Region moved to other areas within Ontario. This represented an intra-provincial migration rate loss of 2.36% of the Province's total internal migrants.

Figure 9

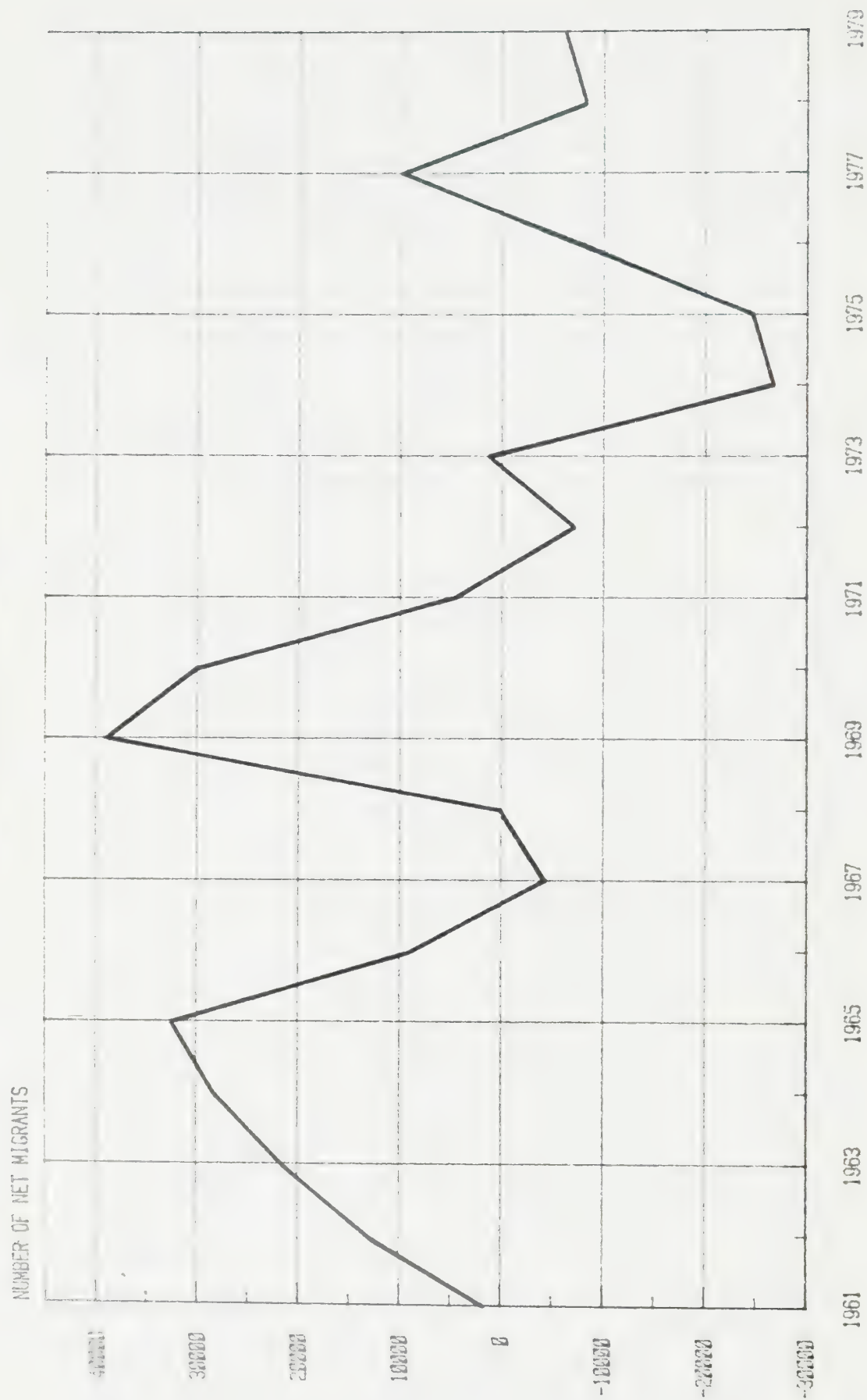
PROPORTION OF INTERNATIONAL MIGRANTS GIVING
HAMILTON AS THEIR INTENDED DESTINATION.

SOURCE: DEPT. OF MAN. AND IMMIGRATION



NET INTER-PROVINCIAL MIGRATION TO ONT.

SOURCE: MINISTRY OF TREASURY AND ECON.



Determination of Regional Net Migration Rates

The relationship between, International, Inter-and Intra-Provincial migration relative to Hamilton-Wentworth Region is expressed in the following equation:

$$\frac{\text{Hamilton-Wentworth's Net Annual Migration Rate}}{\text{Net Annual Migration Rate}} = \frac{(\text{Net Ontario Annual External Migration}) \times (\text{Hamilton-Wentworth's Proportion of Ontario's External Migration}) + (\text{Ontario Total Population (8,500,000)}) \times (\text{Ontario's Net Internal Migration Rate}) \times (\text{Hamilton-Wentworth's proportion of Ontario's Net Internal Migration})}{\text{Net Annual Migration Rate}}$$

Substitution of the current International and Provincial migration trend rates relative to Hamilton-Wentworth into the equation produces a 'Most-Likely' net in-migration of 400 persons per year as follows:

$$\begin{aligned} \text{'Most-Likely' level of Regional Migrants} &= (35,000 \times .035) + (8,500,000 \times .041) \times (-.024) \\ &= (1,225) + (34,850) \times (-.024) \\ &= (1,225) + (-836.4) \\ &= 400 \text{ net migrants a year} \end{aligned}$$

High and Low Net Migration rates were also calculated from the equation. Corresponding high or low values for each of the variables were derived from an examination of the migration charts (Figures 7 to 10) based primarily on frequency of occurrence. The equation was also used to explore the results of extreme migration conditions, as well as the corresponding migration conditions that would have to occur in order to arrive at a population of 550,000 - the 1976 Projection.

Table 16 summarizes the results of the migration analysis. From this information, the projection value of the annual net migration rates for the Region were established:

High	+ 1,500 persons
Low	- 500 persons
'Most-Likely'	+ 400 persons

Figure 11 shows how the range of migration values compare with historical patterns.

PROJECTED REGIONAL NET MIGRATION RATES AND THEIR RESULTING POPULATION

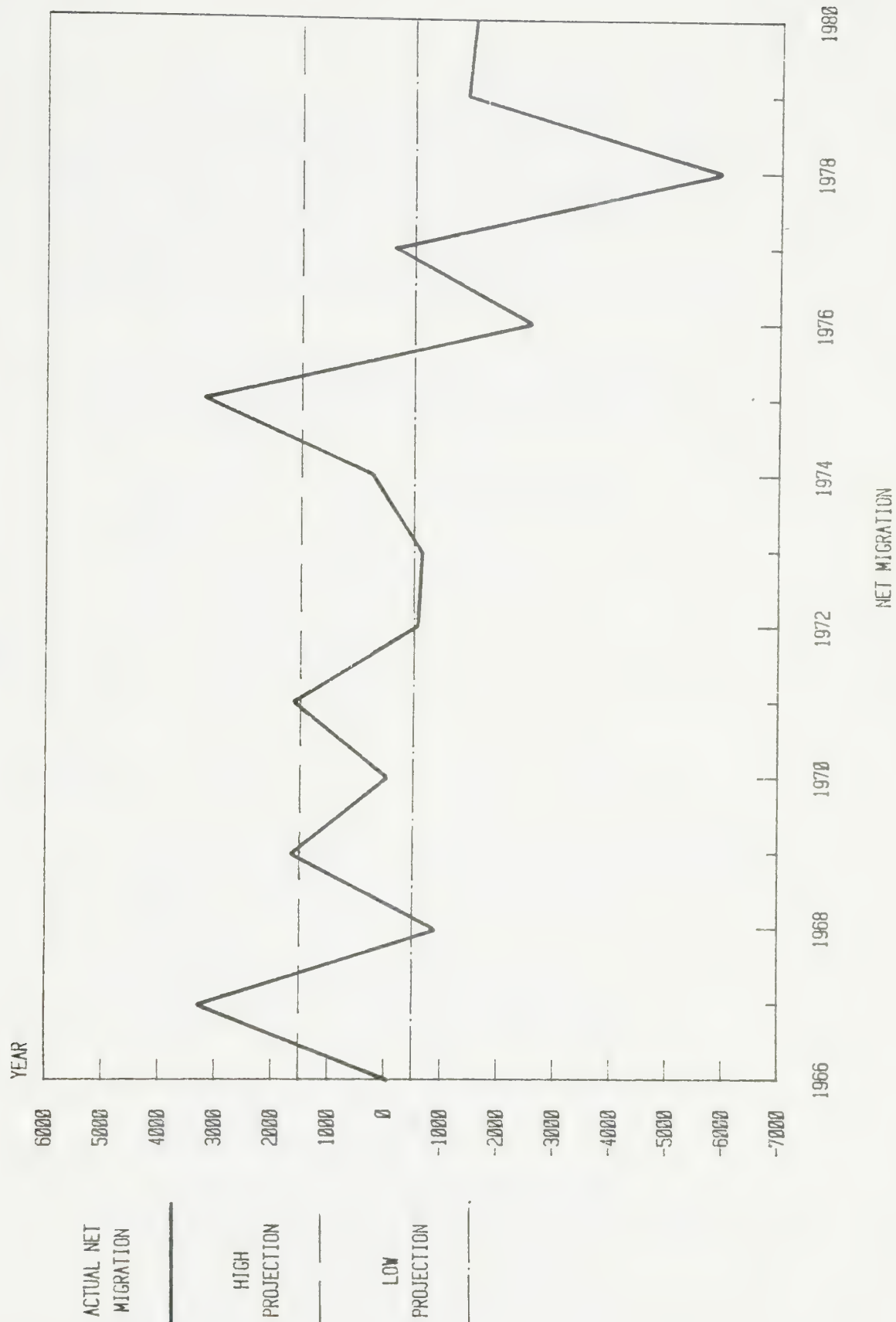
PROJECTION NAME	NET ONTARIO ANNUAL INTERNA- TIONAL MIGRATION	H-W's PROPORTION OF ONTARIO'S MET ANNUAL INTERNA- TIONAL MIGRATION	ONT. NET INTERNAL MIGRATION (% OF TOTAL POP.)	H-W's PROPORTION OF ONT.'S NET INTERNAL MIGRATION	H-W TOTAL NET ANNUAL MIGRATION
Regional *					
Official Plan	75,000	5.0%	.27%	+2.0%	4,200
High #2	60,000	4.5%	.27%	-1.9%	2,250
High #1	50,000	4.0%	.27%	-2.2%	1,500
"Most Likely"	35,000	3.5%	.41%	-2.4%	400
Low #1	25,000	3.0%	.54%	-2.7%	- 500
Low #2	10,000	2.5%	.54%	-3.0%	-1,500

* Migration rates required to reach the 1976 projection of 550,000 persons.

Note: In their current population projections, the Ontario Ministry of Treasury and Economics uses the .27% and 54% figures for intra-Provincial migration.

Figure 11

H-W ACTUAL AND PROJECTED NET MIGRATION



Area Municipal Migration Rates

A high, 'Most-Likely' and low migration rate were projected for each area municipality. The rates were calculated so that the total migration rates for all of the area municipalities in each size category would equal the previous projected Regional migration rates of: -500 under the low rate, 400 under the 'Most-Likely' rate and +1,500 under the high migration rate. The net migration levels for the area municipalities were subjectively derived, based on historic net migration levels and the local conditions assumed to exist in each municipality during the next 20 years.

Table 17 (Page 52) shows the average net migration experienced by area municipalities in the Region from 1971 to 1980. These historical migration rate trends were subjectively modified having regard to the following factors:

- i) employment opportunities;
- ii) community image (perceived attractiveness of the area);
- iii) existing land use controls affecting development;
- iv) residential opportunities of the area (cost, type and availability of housing);
- v) availability of services, and
- vi) competition for development among neighbouring municipalities.

The following assumptions were used in the analysis of the future local conditions in each area municipality.

Eight major new employment opportunity areas are foreseen for the Region:

1. The Duff's Corners Industrial - Business Park in Ancaster
2. The Allarco Industrial Park and the Allarco Shopping Centre in Ancaster
3. The Clappison's Industrial - Business Park in Flamborough
4. The Airport Industrial - Business Park in Glanbrook
5. The Glanbrook Industrial - Business Park in Glanbrook
6. The East Mountain Industrial - Business Park in Hamilton
7. The Stoney Creek Industrial - Business Park in Stoney Creek
8. Additional service sector employment based throughout the Region but with concentrations in the Regional Centre and the Regional Sub-Centres.

It is anticipated that the industrial - business parks in the Region will develop at a rate in proportion to their relative attractiveness; based on their servicing status, accessibility and visibility. The rate and level of development of the Airport Industrial Park will depend on the timing of the expansion of the Regional Airport and the availability of services.

It is assumed that the new employees attracted to these new employment centres will choose their places of residence based on:

- a) accessibility to work place - it is assumed that more people will be attracted to reside in the municipality offering the shortest and most convenient work to home travel distance,
- b) the availability, type, cost and quality of housing offered,
- c) the residential "image" of each municipality.

Assumptions for Area Municipal Migrations

The following conditions have been assumed to exist in the component municipalities of the Region:

i) Ancaster

- Figure A-1 in the appendix shows the net migration to Ancaster from 1971 to 1980. Ancaster has historically had a net migration loss. However, in recent years the trend has reversed, and in 1980, Ancaster experienced a modest gain in net migration.
- The persons per dwelling unit (p.p.d.u.) has fallen in Ancaster from 3.5 in 1975 to 3.2 in 1980.
- Ancaster has a positive residential atmosphere.
- Dwelling units have mostly been of the low density and high quality (cost) type relative to housing available elsewhere in the Region.
- The Allarco development will be the first large "New Town" type planned community in Ancaster, developed by a major private development company.
- Variety in the housing unit types offered is expected.

- The Allarco lands are currently well serviced by transportation routes which provide easy access to employment areas in Ancaster, Flamborough, downtown Hamilton and the Highway 403 - Queen Elizabeth Way Corridor. Transportation service will improve with the construction of the east-west mountain arterial.

ii) Dundas

- Figure A-2 in the Appendix shows the net migration rate experienced by Dundas from 1971 to 1980. Dundas has experienced both negative and positive net migration values that have fluctuated around the zero net migration level. In the last two years the net migration has been positive.
- Dundas's average persons per dwelling unit rate has fallen from 3.2 in 1975 to 2.9 in 1980.
- Potential developable residential land in Dundas is limited to the Morden, Sobel and Turnbull Neighbourhoods. Design population increase is set at 9,000 persons.
- Opportunities for redevelopment (particularly for higher density residential housing) presently exist in the older areas of Dundas.
- The majority of the new housing units currently produced is of the higher value type.
- Transportation from Dundas to areas of employment in the Region is currently, and will likely continue to be relatively poor.
- Residential development in Dundas will likely experience competition from the Allarco development in Ancaster.

iii) Flamborough

- Flamborough has experienced a net migration close to zero from 1971 to 1980 (see Figure A-3 in the Appendix) although higher positive rates were experienced in the mid-1970's. Overall, historic trends show a slightly positive net migration into Flamborough.
- The following local conditions were assumed to exist in Flamborough.

a) Rural Areas

- The population change of the rural-policy areas is dependent upon the rate of rural/urban migration.
- The number of persons per dwelling unit in rural Flamborough has fallen from 3.5 in 1975 to 3.2 in 1980.
- The development of the rural settlements in Flamborough will depend upon: the established planned populations for the rural settlements; their individual settlement capabilities; and their market attractiveness.

b) Urban Area

- The only Regionally designated urban area in Flamborough is Waterdown, the growth of which will be dependent upon:
 - its designated size.
 - sewer capacity, which is currently limited to the receiving capability of the Grindstone Creek Sewage Treatment Plant (approximately 6,000 population). If the Clappison's Industrial Park is serviced from the Dundas Sewage Treatment Plant, additional servicing capacity could be allotted to Waterdown.
 - the p.p.d.u. (persons per dwelling unit) rate in the Waterdown area has declined from 3.2 in 1975 to 2.9 in 1979.

iv) Glanbrook

- Over the past ten years, Glanbrook has experienced a steady net migration loss. (Glanbrook's net migration from 1971 to 1980 is shown in Figure A-4 in the Appendix.)
- Glanbrook's p.p.d.u. has declined from 3.6 in 1975 to 3.3 in 1980.
- Residential opportunities in Glanbrook are severely limited. The Regional Official Plan has restricted residential growth to rural severance lots and has limited development in Mount Hope and Binbrook until services become available.
- There is a constraint on development placed by the poor physical servicing capability of the land.

- The development of Binbrook is dependent upon the provision of full services, which does not seem likely in the near future.
- Residential development in Glanbrook is in competition with the Allarco development in Ancaster, the Heritage Green (O.L.C.) development in Stoney Creek and from the residential areas on Hamilton Mountain.

v) Hamilton

- In seven of the last nine years, Hamilton has experienced significant negative net migration rates, as shown in Figure A-5 in the Appendix.
- There is an ample supply of serviceable residential land in Hamilton.
- The average p.p.d.u. has dropped from 2.9 in 1975 to 2.7 in 1980.
- Gershome Neighbourhood (design population 5,400) is the only significant undeveloped area below the escarpment.
- Much of the existing housing stock in the Lower City is aging (over 60 years old) and will require rehabilitation or redevelopment by the year 2001.
- In the past, new residential development in Hamilton had to contend with a perceived negative community image.
- Hamilton provides a full range of urban and regional services.
- A good public transit system exists with potential for improvement with the addition of the planned Intermediate Capacity Transit System.
- The planned North-South, East-West arterial road system will improve access from the mountain residential areas to the East Mountain Industrial-Business Park, to existing employment opportunities in the City's industrial areas, and to new employment opportunities in Stoney Creek.

vi) Stoney Creek

- in the last nine years, Stoney Creek has had a positive migration rate which has peaked in 1980 at a much higher rate than has been experienced previously. (This is shown on Figure A-6 in the Appendix.)
- The average p.p.d.u. in Stoney Creek has declined from 3.3 p.p.d.u. in 1975 to 3.1 p.p.d.u. in 1980.
- Residential opportunities in Stoney Creek are in two primary locations:
 - i) the Lower Town below the escarpment
 - ii) the Upper Town (includes the Ontario Land Corporation's "Heritage Green" lands).
- The Lower Town has absorbed most of the population increase in the Town in recent years. It offers a good mix of housing and a positive image as a residential area.
- The development in the Lower Town is moving easterly, over time.
- Transportation from the Lower Town to the Regional Centre is poor, but good access exists to the Hamilton Bayfront and Stoney Creek Industrial areas.
- The Upper Town area has not grown as quickly as anticipated. Growth in the area has suffered from a negative public image and poor accessibility to employment opportunities.
- Planned new marketing strategies by the Ontario Land Corporation, which owns a significant land bank in the area, may increase the growth rate of the area.
- The planned improvements to the Q.E.W. Skyway Bridge may increase the desirability of lower Stoney Creek as a commuting area to the Burlington-Toronto corridor. It may also increase the development potential of the Stoney Creek Industrial area.
- The planned North-South, East-West Arterial will improve the access of the Upper Town residential areas to employment opportunities below the escarpment. The arterial will also improve the development potential of the East Mountain and Glanbrook Industrial Parks.

Table 17

COMPARISON OF HISTORICAL AND PROJECTED ANNUAL NET MIGRATION RATES

	1971 - 1980		1976 - 1980		PROJECTION ALTERNATIVES		
	TOTAL	ANNUAL AVERAGE	TOTAL	ANNUAL AVERAGE	HIGH	LOW	"MOST LIKELY"
ANCASTER	-1,804	-180	-382	-76	1,000	475	675
DUNDAS	939	94	34	7	100	-75	0
FLAMBOROUGH	712	71	299	60	250	0	100
GLANBROOK	-876	-88	-683	-137	-50	-125	-75
HAMILTON	-11,651	-1,165	-14,146	-2,829	-600	-1,200	-875
STONEY CREEK	5,635	564	4,094	819	800	425	575
REGION	-7,045	-705	-10,784	-2,156	1,500	-500	400

Historical data source: Assessment Census, Ministry of Revenue.

Determination of Area Municipality Net Migration Rates

Using historic net migration levels and the local conditions that are assumed to exist in each municipality in the future, the Regional high, "most likely", and low migration levels of 1,500, 400 and -500 respectively were allocated to area municipalities (see Table 17).

i) High Net Migration Projections

Ancaster

In this set of projections an assumption was made that Ancaster will gain an average of 1,000 people a year, a substantial gain from historic trends. This rate was based on the premise that the Allarco development will be a major residential growth area in the Region and will attract substantial levels of migrants. In addition, more migrants may be drawn to Ancaster due to increased employment opportunities there. Assuming that new dwellings are occupied by 3 persons, the rate of 1,000 migrants a year would result in an additional* housing unit production of 333 dwelling units a year, which is reasonable, given growth in both the Allarco area and the rest of Ancaster.

Dundas

Dundas is projected to gain 100 migrants a year under the high projection which is consistent with historic migration rates and the anticipated competition between Dundas and adjacent municipalities for limited development opportunities.

Flamborough

The projected high migration rate for Flamborough is 250 people a year. To achieve this level (which is considerably higher than current levels), it is assumed that the Waterdown Urban Area will be fully serviced and that a number of the Rural Settlement areas in the Township will develop.

Another assumption made is that Flamborough will gain migrants as a result of its close proximity to the City of Burlington. Migrants attracted to Flamborough could be employed in the Burlington to Toronto urban complex.

Glanbrook

Glanbrook is projected to lose 50 persons a year under the high projection which is a smaller loss than has been historically experienced. To achieve this level, the settlement of Binbrook would have to be fully serviced and substantially developed.

* Not counting dwelling units constructed to offset falling person per dwelling unit rates.

Hamilton

Under the high projection, a net migration of -600 is projected for Hamilton which is a considerably smaller migration loss than has been historically experienced. (In the past five years, Hamilton has had an average net migration loss of 2,829). However, it is projected that once the p.p.d.u. rate decline levels off in Hamilton, the effect of:

- i) a large existing housing stock,
- ii) a good potential for redevelopment (particularly for higher density housing) in older areas of the city,
- iii) continued development on the Mountain, and
- iv) a possible return of people to inner city areas, possibly as a result of high energy costs,

will reduce the high migration loss typically experienced by the City.

Stoney Creek

The high projection for Stoney Creek uses a net migration rate of 800 persons per year which is considerably below the 1980 migration level but generally matches the trends of the previous three years. To achieve this level of migration over the next 20 years, it is assumed that a large portion of the Stoney Creek Industrial Park will develop and that many of the new employees generated by the Park will reside in Stoney Creek. In addition, it is assumed that the rate of development in the Upper Town will improve with new design concepts and marketing strategies.

ii) 'Most-Likely' Net Migration Projections

Ancaster

In this set of projections, Ancaster was assumed to gain 675 net migrants a year. Again, it was assumed that the Allarco development would be a major residential growth area and attractor of migrants. Many of the migrants attracted to Ancaster will be from within the Region. Other migrants may be drawn to Ancaster due to increased employment opportunities there.

Dundas

Dundas is projected to have an equal number of incoming and outgoing migrants each year (zero net migrants) which seems reasonable if historic positive and negative net migration rates continue and if Dundas experiences significant competition for new residents.

Flamborough

The projected 'Most-Likely' migration rate for Flamborough is 100 people a year. This rate is higher than the rate experienced in the past ten years. To achieve this level, it is assumed that several of the Rural Settlement areas would be developed and that Waterdown will gain migrants from the Halton-Burlington area.

Glanbrook

Glanbrook is projected to lose 75 people a year under the "Most Likely" experience which is a smaller migration loss than the rate Glanbrook has experienced in the past five years of -134 net migrants a year. To achieve this level, rural to urban migration would have to "bottom out" in the Township and a modest growth would occur in an unserved Binbrook and Mount Hope.

Hamilton

Hamilton is projected to lose 875 persons a year under the 'Most-Likely' scenario. This is a smaller migration loss than has been historically experienced. However, it is assumed that once the person per dwelling unit rate decline levels off in Hamilton, the effect of:

- i) a large existing housing stock,
- ii) a good potential for redevelopment (particularly for higher density housing) in older areas of the City,
- iii) continued development on the Mountain, and
- iv) a possible return of people to inner city areas, possibly as a result of high energy costs,

will reduce the high migration loss typically experienced by the City.

Stoney Creek

Under the 'Most-Likely' projection, Stoney Creek is projected to gain 575 net migrants a year which is considerably below historic trends. The lower level is the result of:

- i) moderate rate of development of the Stoney Creek Industrial Park;
- ii) smaller gains from intra-Regional migration from Hamilton; and
- iii) increased competition from other residential areas in the Region.

iii) Low Area Net Migration Projections

Ancaster

In this set of projections, Ancaster was assumed to gain 475 net migrants a year, half of the rate it would gain under the high projection. This rate is still high given that the net Regional migration under this projection is -500 a year. This relatively high level was projected because it is expected that Ancaster will gain much of its population from intra-Regional migration.

Dundas

Dundas is projected to lose 75 migrants a year under the low projection. This is a result of the general Regional migration loss under the low projection, Dundas' lack of new employment opportunities and an expected high level of competition for new residents.

Flamborough

Flamborough is projected to have an equal level of incoming and outgoing migrants (zero net migration) under the low projection. This level of migration could be caused by:

- i) a low level of development in the Clappison's Industrial Park;
- ii) continued rural to urban movement;
- iii) limited growth in the rural settlements;
- iv) high energy costs; and
- v) modest growth in Waterdown.

Glanbrook

Under the low projection, Glanbrook is projected to lose 125 migrants a year. This is approximately equal to the average net migration loss that Glanbrook has experienced over the past five years. This would be the migration rate experienced if Binbrook is unserved and develops at a low level and if rates of rural to urban movement continue.

Hamilton

Hamilton is projected to lose 1,200 net migrants annually under the low projection. This level is a smaller rate of migration loss than the rate experienced in Hamilton in the last five years (-2,842) and is the reflection of:

- i) a large existing housing stock;
- ii) a good potential for redevelopment;
- iii) continued development on the Mountain; and
- iv) the possible trend of a return to inner city living that has been experienced in other cities.

Stoney Creek

The low projection for Stoney Creek uses a migration rate of 425 net migrants a year. This is considerably lower than migration rates historically experienced in the Town and is based on:

- i) moderate rate of development of the Stoney Creek Industrial Park; and
- ii) smaller gains from intra-Regional migration from Hamilton and increased competition from other residential areas in the Region.

3.2.5.2 Profile of Age and Sex of Migrants

Two methods were used to determine the age and sex profile of the Regional migrants, one for the profile used for negative net migration, and one for the profile for positive net migration.

The age sex profile for the negative net migrants to the Region was calculated by examining the age and sex profiles of the migrants of past years when negative migration occurred. The proportion of the net migrants in five year age and sex groups for each past year of negative migration was prepared and an average of the proportions was used to obtain the final profile.

The past profiles of negative migrants were made by comparing age and sex groups of population from one year (year x) to the age and sex group of the population in the next year (year x +1). This profile, shown in Table 18, was then applied to the negative annual net migration figure of -500.

The profile of the positive net migrants to the Region could not be calculated in the same way due to the lack of available data. The method used to calculate the positive net migration profile was to examine the profile of migrants to a typical area of recent development in the Region, Planning Unit 54 in Stoney Creek, and to assume that a positive net migration to the Region would consist of similar ages and sex of its migrants. The resulting profile is shown in Table 19.

The age and sex profiles for the area municipalities were calculated using a similar methodology to that used in the negative migrant profile for the Region. The resultant migrant profiles are shown in Tables 20 to 23. Negative profiles were not required for Ancaster, Flamborough and Stoney Creek, while positive profiles for Glanbrook and Hamilton were not required. Data were not available for the Ancaster positive and the Dundas positive and negative migration profiles and the respective Regional profiles were used to allocate migration in these instances.

Table 18

AGE AND SEX PROFILE - NEGATIVE MIGRANTS - REGION

AGE GROUP	MALES %	FEMALES %	TOTAL %
U-1	- 2.75	- 2.75	- 5.5
1-4	13.4	13.4	26.8
5-9	- 7.75	- 7.75	-15.5
10-14	- 3.6	- 3.0	- 6.6
15-19	- 3.5	- 2.0	- 5.5
20-24	-12.4	-16.6	-29.0
25-29	-14.6	-13.1	-27.7
30-34	- 4.0	- 6.2	-10.2
35-39	- 3.1	- 2.8	- 5.9
40-44	- 2.3	- 2.9	- 5.2
45-49	- 3.4	- 3.4	- 6.8
50-54	- 3.0	- 2.1	- 5.1
55-59	- 4.3	- 3.3	- 7.6
60-64	- 3.6	- 0.5	- 4.1
65-69	0.7	- 1.5	- .8
70-74	1.1	.9	2.0
75-79	1.3	1.0	2.3
80-84	1.4	1.2	2.6
85+	.4	1.7	2.1
TOTAL			- 100.0

Table 19

AGE AND SEX PROFILE - POSITIVE MIGRANTS - REGION

AGE GROUP	MALE %	FEMALE %	TOTAL %
U. 1	3. 1	3.1	6. 2
1- 9	6. 7	6.7	13. 4
5- 9	4. 5	4.5	9. 0
10-14	4. 7	4.7	9. 4
15-19	2. 0	2.2	4. 2
20-24	4. 1	6.0	10. 1
25-29	7. 9	8.3	16. 2
30-34	7. 9	4.1	12. 0
35-39	2. 4	1.9	4. 3
40-44	1. 5	1.6	3. 1
45-49	1. 5	1.3	2. 8
50-54	0	.3	. 3
55-59	. 5	-.2	. 3
60-64	0	0	0
65-69	-. 1	-.2	-. 3
70-74	1. 1	.9	2. 0
75-79	1. 3	1.0	2. 3
80-84	1. 4	1.2	2. 6
85+	. 4	1.7	2. 1

Table 20

AGE AND SEX PROFILE - POSITIVE MIGRANTS - FLAMBOROUGH

AGE GROUP	MALES %	FEMALES %	TOTAL %
U-1	4.00	4.00	8.00
1-4	6.96	6.96	13.93
5-9	10.85	10.85	21.70
10-14	7.03	7.50	14.53
15-19	-16.65	-22.70	-39.35
20-24	-15.35	-8.40	-23.75
25-29	11.06	23.54	34.60
30-34	17.87	9.53	27.40
35-39	13.82	8.17	21.99
40-44	9.00	8.29	17.29
45-49	7.43	5.30	12.73
50-54	.23	-2.04	-1.81
55-59	.61	.17	.78
60-64	-.26	-1.41	-1.67
65-69	.63	-1.26	-.63
70-74	1.36	-1.78	-.42
75-79	-.76	-.86	-1.62
80-84	1.57	.48	2.05
85+	-2.71	-3.04	-5.75
		TOTAL	100.00

Table 21

AGE AND SEX PROFILE - NEGATIVE MIGRANTS -GLANBROOK

AGE GROUP	MALES %	FEMALES %	TOTAL %
U - 1	5.43	5.43	10.86
1 - 4	-.20	-.20	- .40
5 - 9	1.00	1.00	2.00
10 -14	-10.16	-6.15	-16.31
15 -19	-22.59	-22.76	-45.35
20 -24	-17.38	-3.39	-20.77
25 -29	8.84	13.39	22.23
30 -34	-.82	4.58	3.76
35 -39	-.28	-7.79	- 8.07
40 -44	.30	.63	.93
45 -49	.31	-5.01	- 4.70
50 -54	-5.15	-9.13	-14.28
55 -59	-4.17	-5.71	- 9.88
60 -64	-4.64	- .85	- 5.49
65 -69	-1.44	-3.00	- 4.44
70 -74	-2.73	-2.76	- 5.49
75 -79	- .12	-1.13	- 1.25
80 -84	- .81	1.0	- .19
85 +	- .84	-2.32	- 3.16
		TOTAL	-100.00

Table 22

AGE AND SEX PROFILE - NEGATIVE MIGRANTS - HAMILTON

AGE GROUP	MALES %	FEMALES %	TOTAL %
U-1	2.87	2.87	5.74
1-4	- 2.45	- 2.45	- 4.90
5-9	- 3.14	- 3.14	- 6.28
10-14	- 1.89	- 1.89	- 3.78
15-19	- 3.30	- 2.24	- 5.54
20-24	-12.54	-15.44	-27.98
25-29	-12.53	-11.34	-23.87
30-34	- 8.52	- 7.22	-15.74
35-39	- 4.44	- 1.44	- 5.88
40-44	- 1.95	- 2.17	- 4.12
45-49	- 1.92	- 1.63	- 3.55
50-54	- 3.68	- 2.96	- 6.64
55-59	- 1.92	- .67	- 2.59
60-64	- 1.12	.36	- .76
65-69	- .36	.68	.32
70-74	.58	.08	.64
75-79	.21	- .99	- .78
80-84	1.64	1.37	3.01
85+	.40	2.30	2.70
TOTAL			-100.00

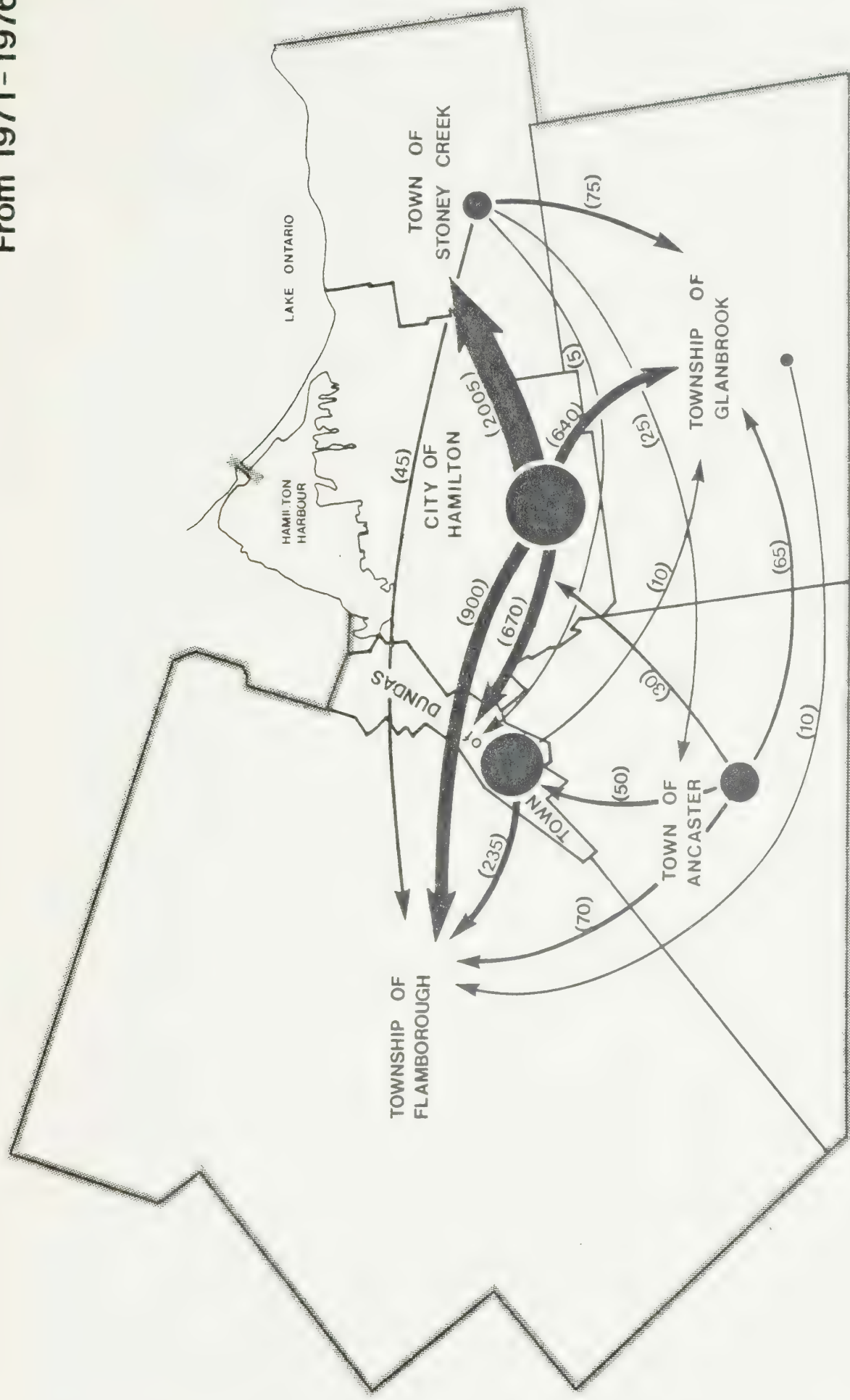
Table 23

AGE AND SEX PROFILE - POSITIVE MIGRANTS - STONEY CREEK

AGE GROUP	MALES %	FEMALES %	TOTAL %
U-1	9.56	9.56	19.12
1-4	6.30	6.30	12.60
5-9	13.50	13.50	27.00
10-14	4.27	5.67	9.94
15-19	-13.70	- 6.94	-20.64
20-24	- 4.32	- 5.08	- 9.40
25-29	2.81	12.44	15.25
30-34	11.01	10.25	21.26
35-39	9.02	3.90	12.92
40-44	4.76	- 1.40	3.36
45-49	1.46	1.15	2.61
50-54	.26	- 2.70	- 2.44
55-59	.60	- 1.30	- .70
60-64	1.53	- .45	1.08
65-69	.45	1.08	1.53
70-74	.97	- .84	.13
75-79	2.38	2.29	4.67
80-84	1.78	.28	2.06
85+	.48	- .83	- .35
TOTAL			100.00

A P P E N D I X

Intra-Regional Migration From 1971-1976

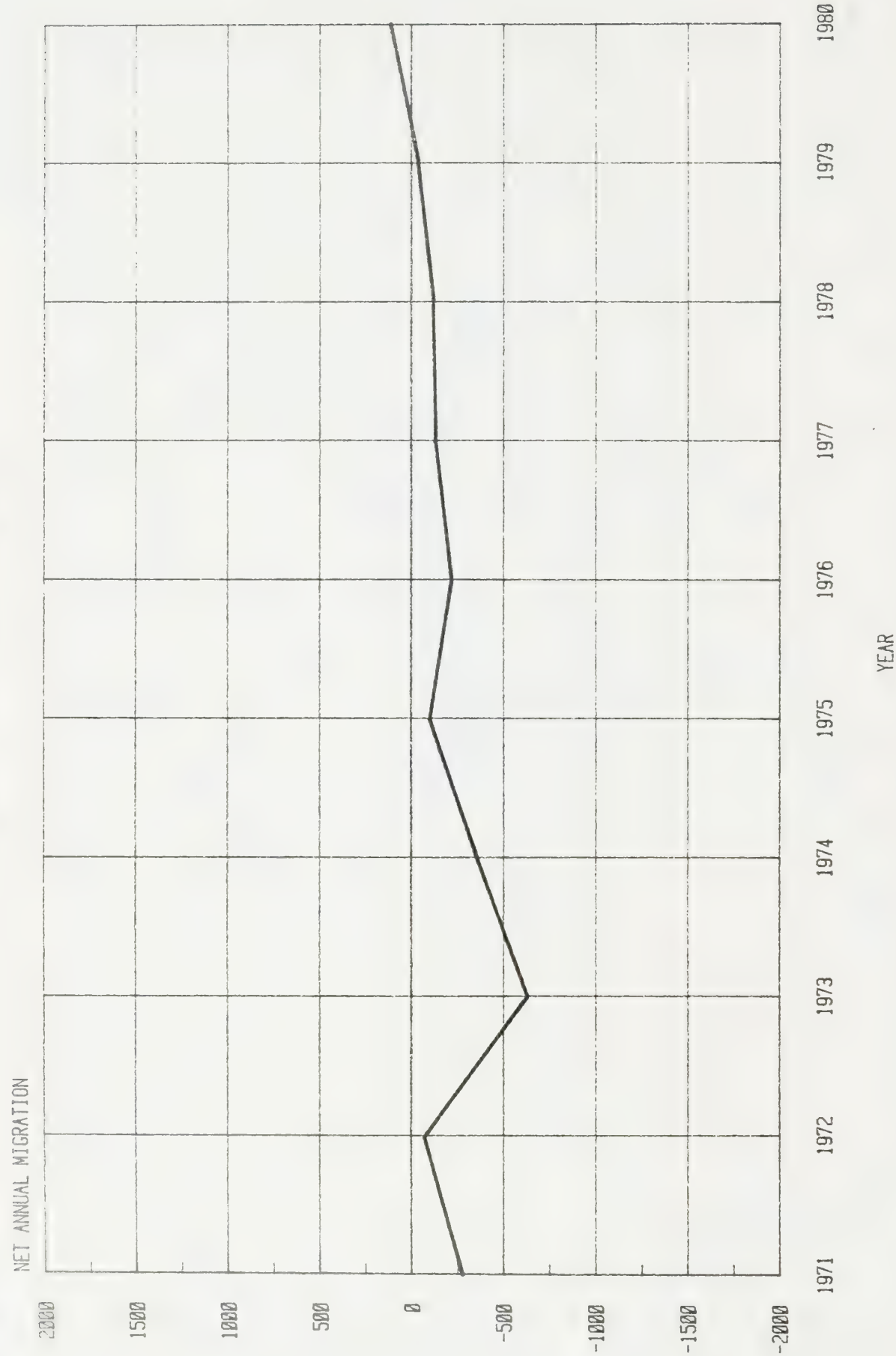


Legend

(5) Net Migrants 1971-1976

ANCASTER NET MIGRATION 1971-1980

FROM ASSESS. AND REG. GEN. (1979&80 EST)



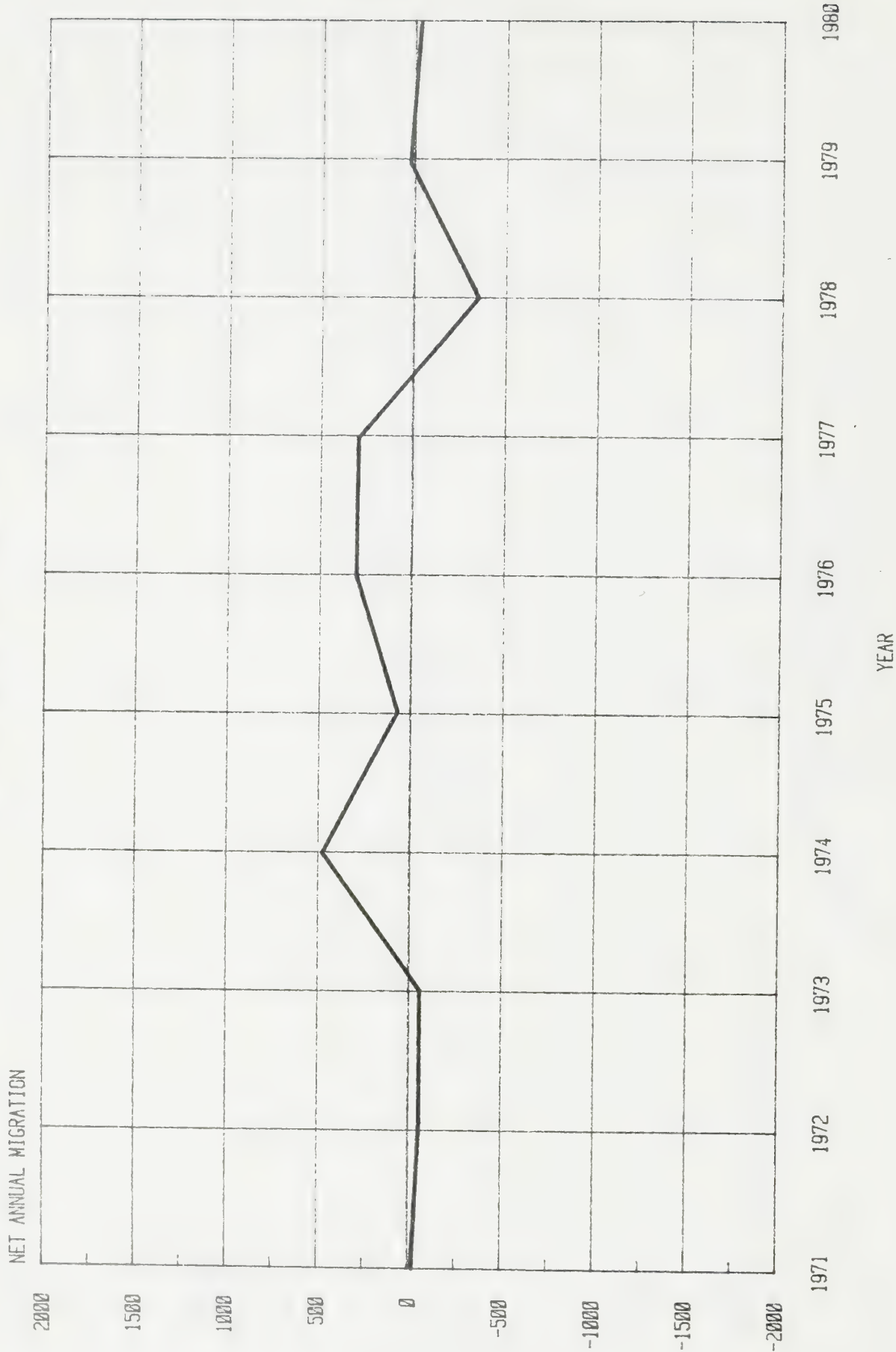
DUNDAS NET MIGRATION 1971-1980

FROM ASSESS. AND REG. GEN. (1979/80 EST)



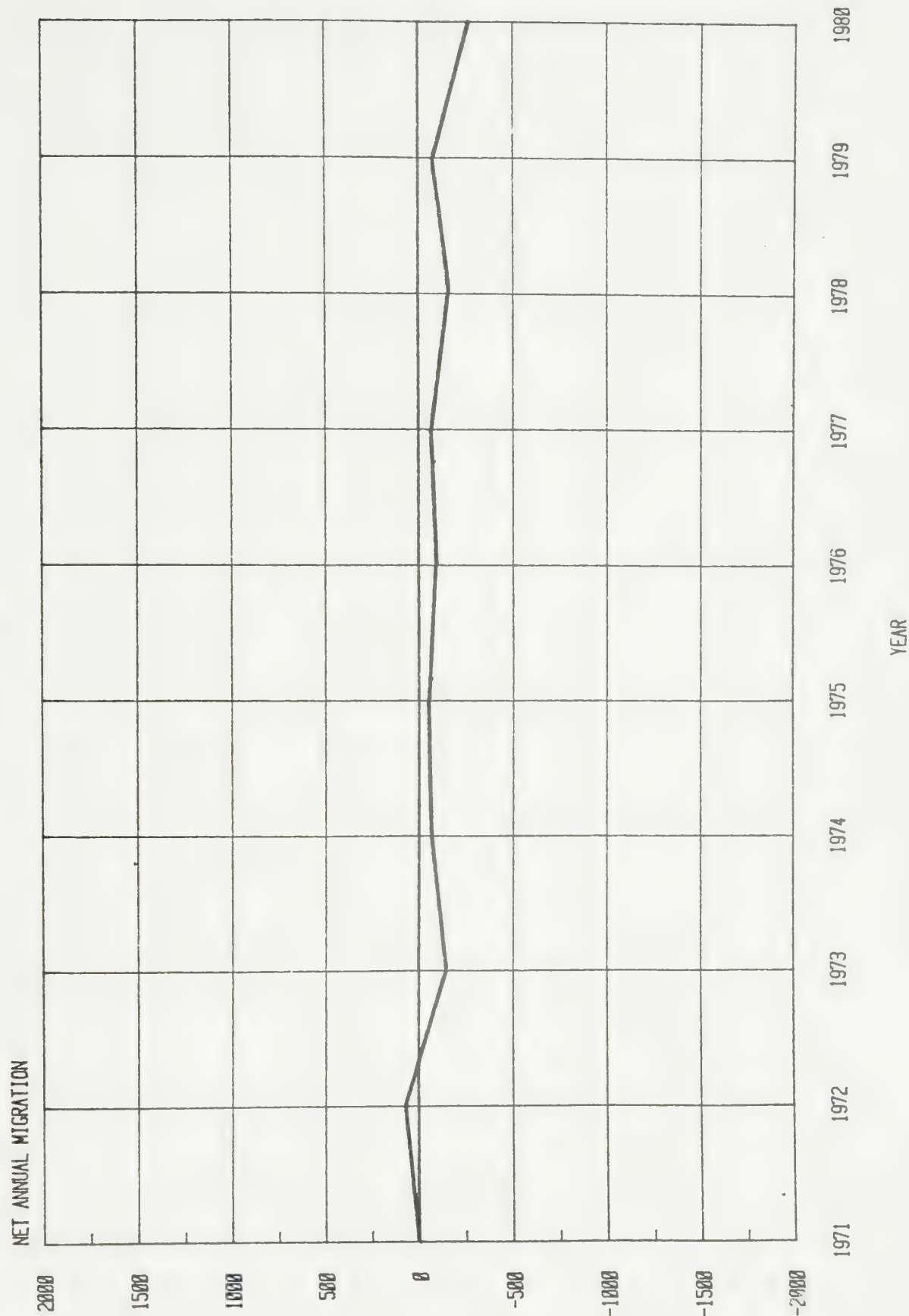
FLAMBOROUGH NET MIGRATION 1971-1980

FROM ASSESS. AND REG. GEN. (1979&80 EST)



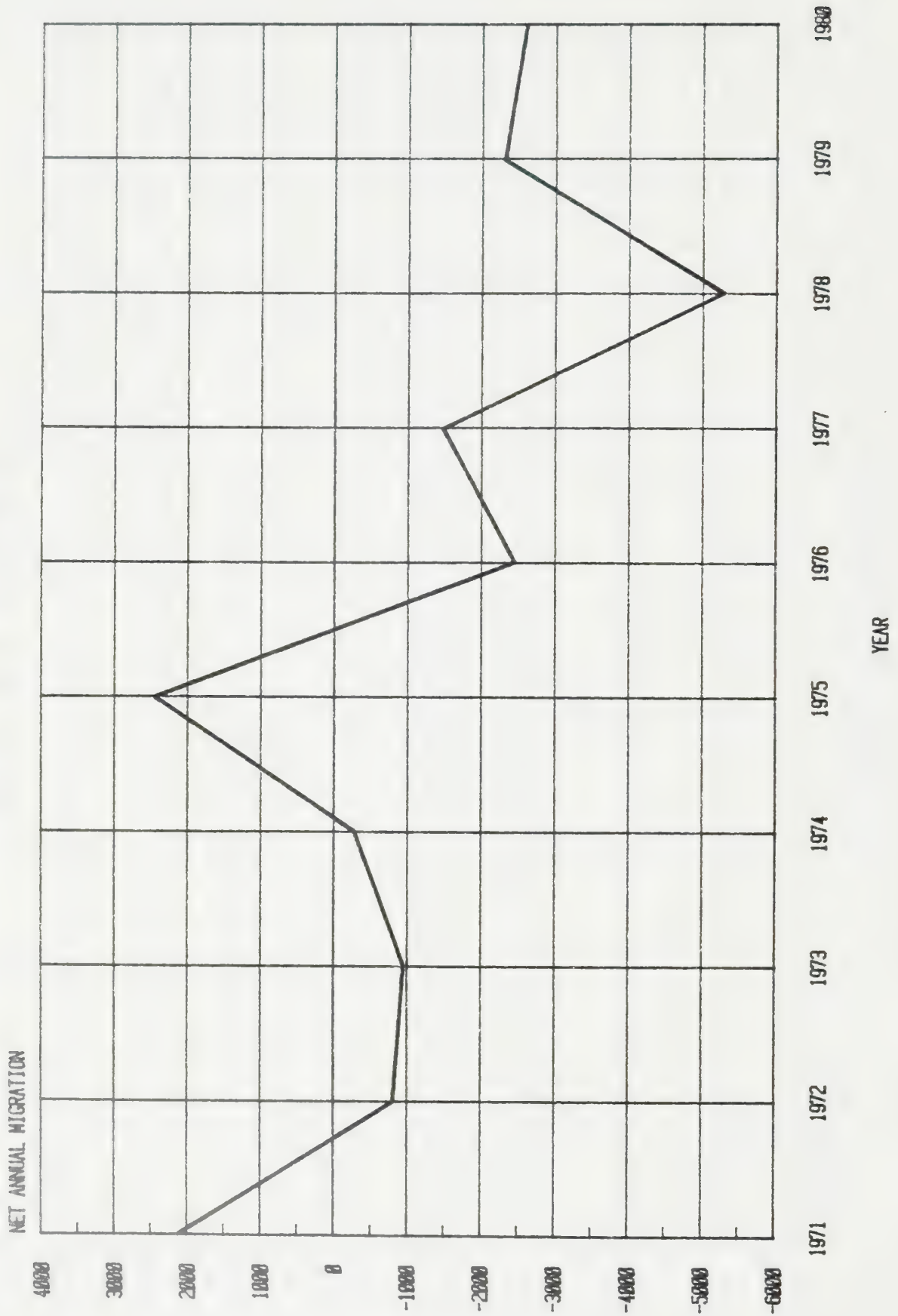
GLANBROOK NET MIGRATION 1971-1980

FROM ASSESS. AND REG. GEN. (1979-80 EST)



HAMILTON NET MIGRATION 1971-1980

FROM ASSESS. AND REG. GEN. (1979:80 EST)



STONEY CREEK NET MIGRATION 1971-1980

FROM ASSESS. AND REG. GEN. (1979-80 EST)

